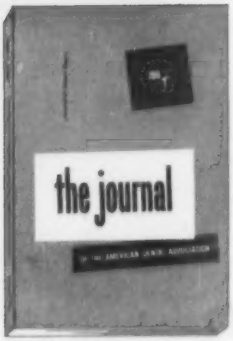
the journal

OF THE AMERICAN DENTAL ASSOCIATION



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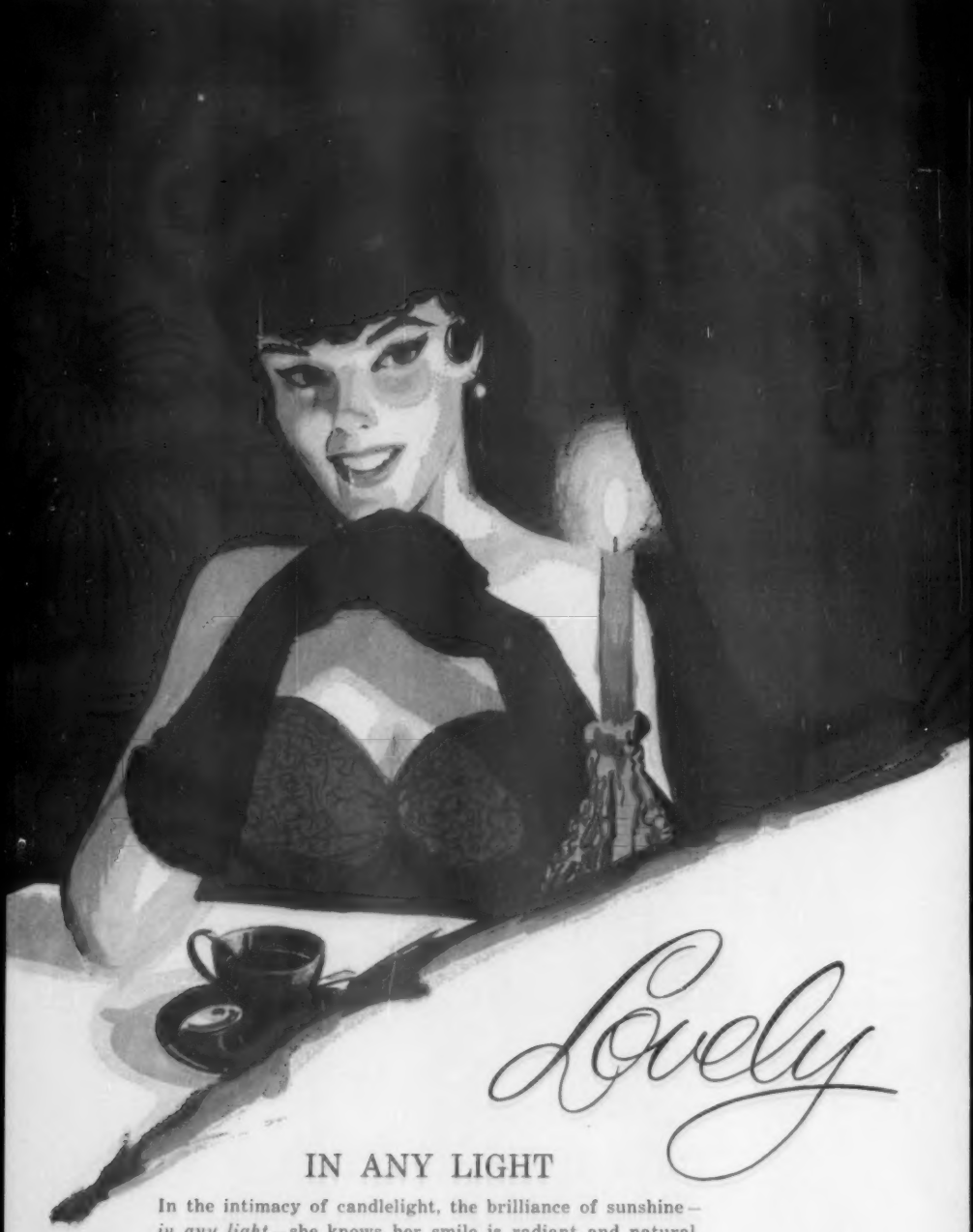

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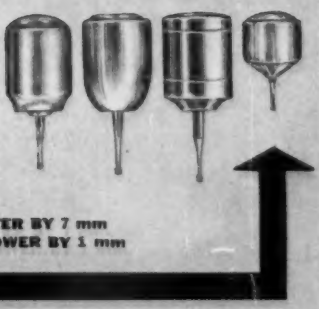

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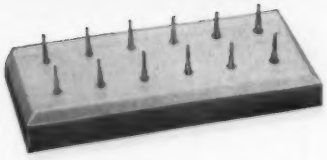

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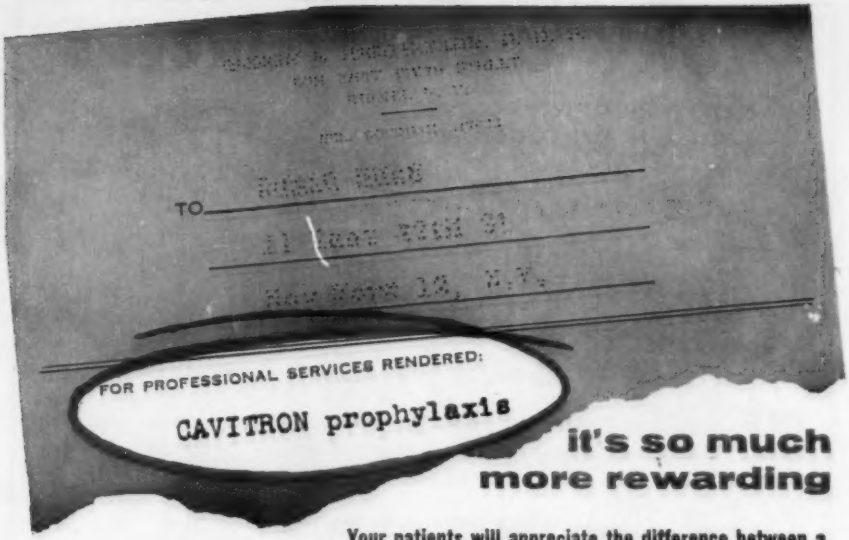

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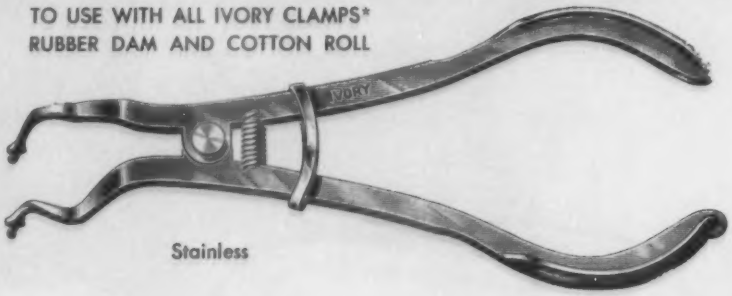

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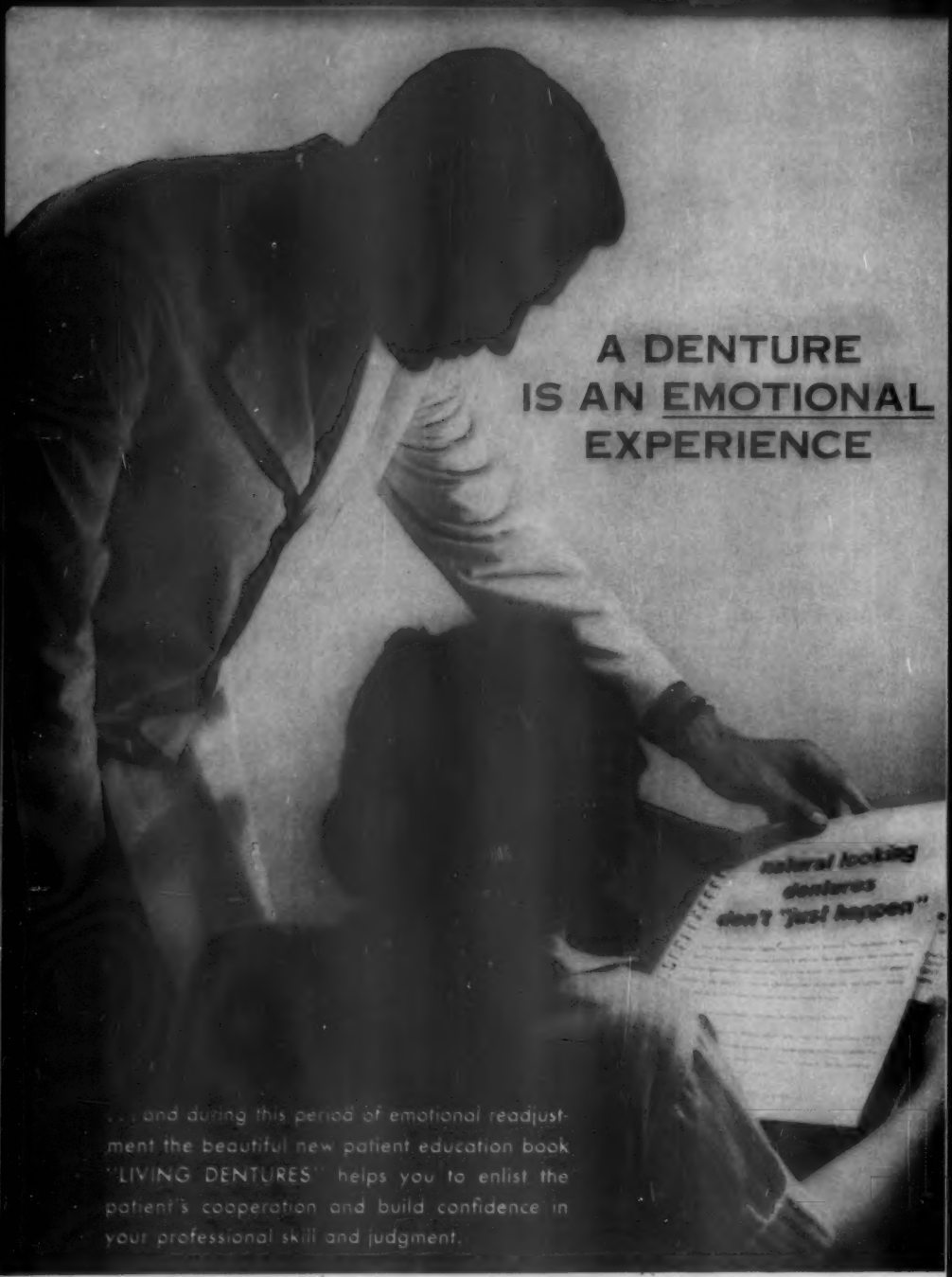
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Fluoride dentifrices

Thomas J. Hill, D.D.S., Brecksville, Ohio

A review of the reported experiments with fluoride dentifrices suggests that the studies cannot be compared one with the other, but must be considered as separate, individual experiments. The one thing that is constant is that all of the studies have shown some degree of control of caries, although the results of some tests are not significant statistically. Methods of instruction and supervision in oral health contribute to the control of the dental caries rate.

It is recognized that the main function of a dentifrice is to aid in the cleaning of the teeth and gingival areas. However, there has been constant and continued effort to find some substance that could be incorporated into a dentifrice that would be beneficial in the prevention of the incidence or the rapidity of the carious process.

The demonstration of the value of topically applied fluorides led to a study of the relative merits of different forms of fluorides. Klinkenberg and Bibby[1] reported that lead fluoride was effective in the reduction of caries after four applications of 0.06 per cent solution. Galagan and Knutson[2] found lead fluoride to have no beneficial effect.

Howell and others[3] compared the effects of topical application of sodium fluoride with the effects of topical application of stannous fluoride, and balanced the study with a control group. They found that sodium fluoride and stannous fluoride produced a like reduction of caries the first year, but at the end of two years stannous fluoride was more effective than sodium fluoride.

After it had been demonstrated that both water fluoridation and topical application of fluorides reduce the incidence of dental caries, it was natural that investigations would be conducted to determine the effectiveness of these substances when incorporated into a dentifrice. Inasmuch as it is difficult to give an accurate and complete analysis of the experiments with fluoride dentifrices, an attempt will be made here to review some

of the more pertinent trials. It is hoped that this will cast some light on the possible value of fluoride dentifrices as a means of caries control.

REVIEW OF STUDIES

The amount of available evidence on effects of the incorporation of sodium fluoride into a dentifrice is scanty. Most of the experimental tests have been conducted with stannous fluoride dentifrices. Winkler, Dirks, and van Amerongen[4] used a sodium fluoride dentifrice on 93 boys, 11 to 15 years old, and observed no inhibition of caries on the distal surfaces. Muhler, Radike and Nebergall[5] tested the anticariogenic effect of dentifrices containing sodium fluoride and stannous fluoride. Their study used three groups of children aged 6 to 16; one group used a dentifrice containing sodium fluoride, one group used a dentifrice containing stannous fluoride, and the third group was a control. There were a little over 200 children in each group. At the end of one year the group using sodium fluoride dentifrice showed a reduction of 9.9 per cent in DMF surfaces and the group using stannous fluoride dentifrice showed a reduction of 36 per cent in DMF surfaces (Fig. 1). The reduction of decayed surfaces per child was 0.24 for the sodium fluoride dentifrice and 0.87 per child for the stannous fluoride dentifrice (Fig. 2).

Muhler, Radike, Nebergall and Day[6] conducted the first clinical test of stannous fluoride dentifrice, using 419 children 6 to 16 years old. The test included oral prophylaxis twice a year with unregimented brushing, although the brushing was checked periodically by the hygienist. At the end of six months the experimental group had a reduction in DMF surfaces of 71 per cent (Fig. 3). The increment reduction in DMF surfaces was 1.29 surfaces per child (Fig. 4). At the end of one year the reduction in DMF surfaces was 1.46 surfaces per child, or a reduction of 49 per cent. In this test there was a significant reduction during the first six months but during the second six months there was little further reduction.

Muhler and Radike[7] conducted another test for the effectiveness of a stannous fluoride dentifrice on adults. In this test they used freshman students from the University of Indiana; 247 students, 18 to 27, were studied for two years; 131 were in the experimental group and 116 were in the control group. The dentifrice used in this experiment was like the one used on children. The students had a prophylaxis every six months and followed routine brushing procedures. The results of this test showed a reduction in the stannous fluoride group of 30 per cent for DMF teeth and 35 per cent for DMF surfaces. The increment difference was a reduction in the stannous fluoride group of 0.46 DMF teeth and 1.68 DMF surfaces for the two years. The increment difference was equally distributed among the two years.

A study which I conducted on public school children tested the value of a stannous fluoride dentifrice. The dentifrice used was an experimental formula and was slightly different from the commercial form. The difference was in the binder and the pH of the paste. There were 190 children in the control group and 189 children in the experimental group; the children were from 9 to 16 years of age. They were given a prophylaxis twice a year by a hygienist who gave repeated instructions on home care. In an effort to reproduce the conditions of use by the public, there was no supervised brushing; but the children were given quantities of the dentifrice for home use.

The reduction of DMF teeth in the experimental group over the control group was 16 per cent at the end of the first year and 12 per cent at the end of the second year (Fig. 5). The reduction in DMF surfaces in the experimental group over the control group was 14 per cent at the end of the first year and 15 per cent at

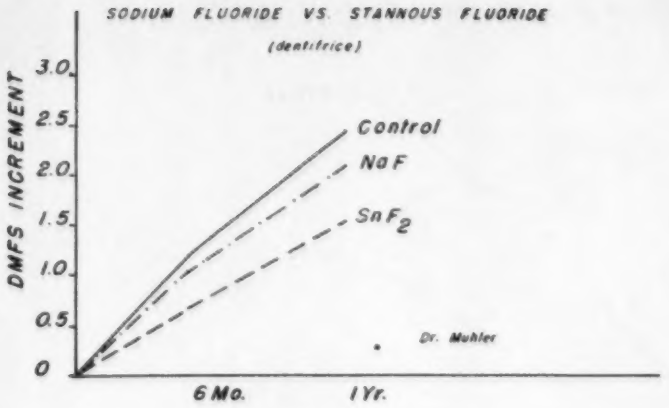

Figure 1

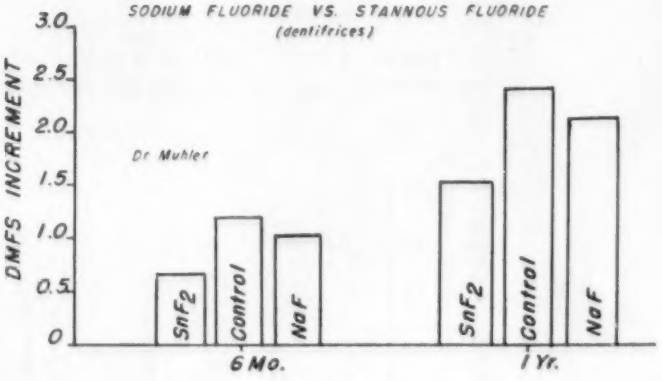

Figure 2

the end of the second year. The increment reduction of surfaces for the stannous fluoride group was 0.62 surfaces per child at the end of the first year and 1.1 surfaces per child at the end of the second year (Fig. 6). This reduction, though small, was consistent for both of the two years. The distribution of the caries reduction was: proximal surfaces, 22 per cent; occlusal surfaces, 13 per cent, and buccolingual surfaces, 11 per cent. Although these figures are not statistically significant, there was a small reduction in caries noted at each of the four examinations during the two year period.

Whereas in this and other similar experiments in caries control, there may be differences between the experimental and control groups, the conditions of an oral hygiene experiment tend to produce a reduction in the caries incidence in both groups. In this experiment, the increment of DMF surfaces in the control group had a reduction between the first and fourth

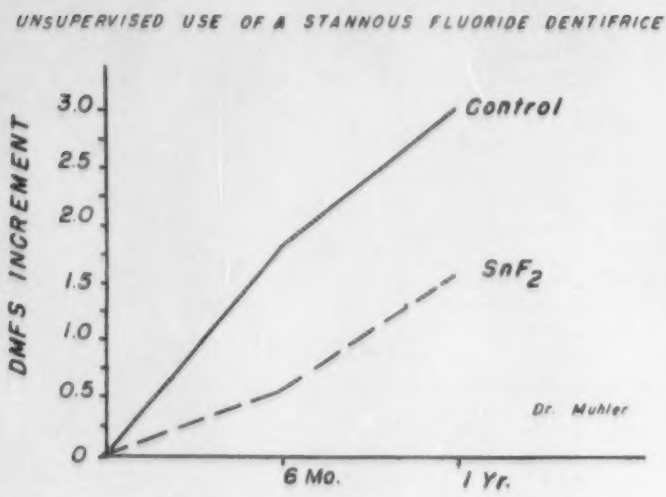

Figure 3

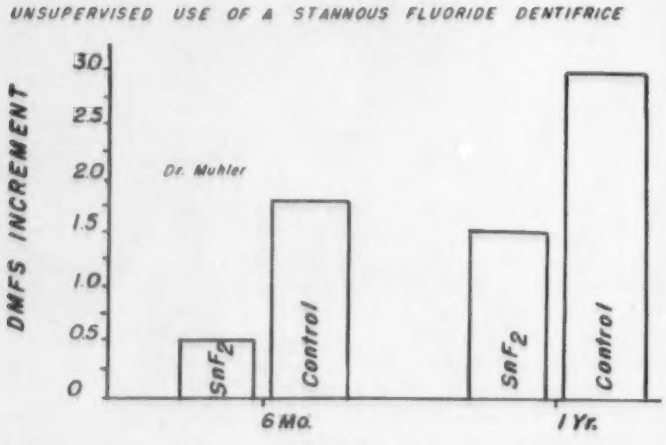

Figure 4

six-month examinations of 0.39 surfaces per child. This figure does not enter into the differences between the control and the experimental groups, but does indicate that the close supervision of an oral hygiene program such as exists in clinical experimentation has a tendency to reduce the caries incidence in all the children.

Jordan[8,9] has conducted an experiment with the commercial brand of stannous fluoride dentifrice on school children of ages 8 to 11. There were 257 children in the control group and 248 children in the experimental group. The children

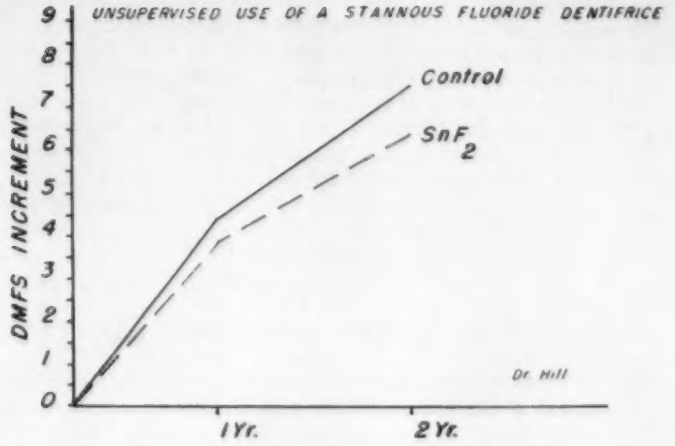

Figure 5

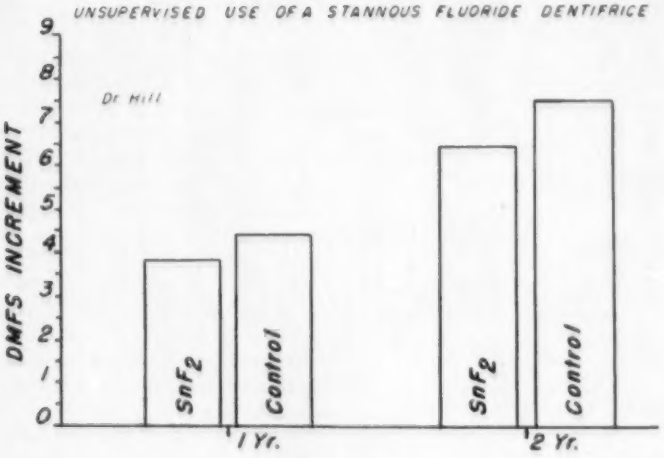

Figure 6

brushed their teeth under supervision once each day after lunch and were encouraged to follow good oral hygiene methods at home. The group using the stannous fluoride dentifrice had a reduction in DMF surfaces of 35 per cent the first year and 21 per cent the second year (Fig. 7). The increment reduction for the fluoride group was 0.765 DMF surfaces at the end of the first year and 0.92 DMF surfaces at the end of the second year (Fig. 8). Although there was a reduction during both years, the reduction during the second year was very small. The experiment ended at the end of the second year and from then on the chil-

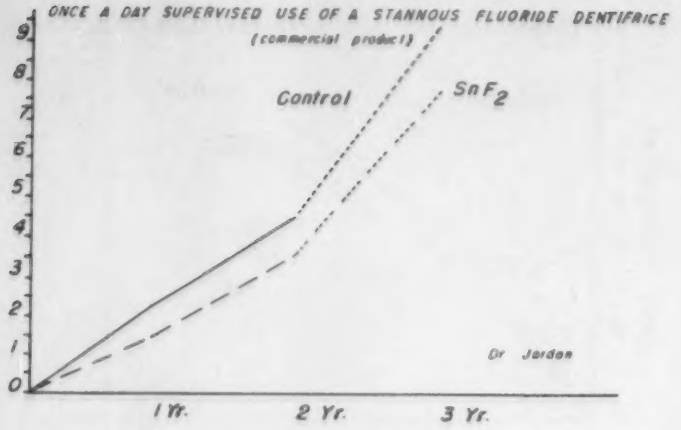

Figure 7

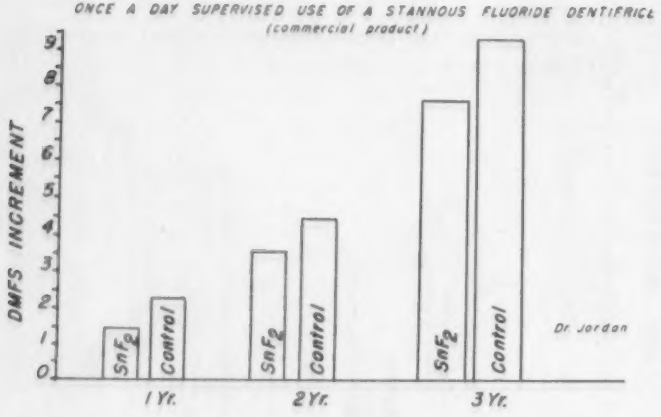

Figure 8

dren selected and used dentifrices of their own choice, and regimented brushing ended.

The children were examined at the end of the third year and the investigator has given me permission to use the unpublished data of that examination. It showed a difference of 1.66 carious surfaces per child in the increment of caries between the children who had previously used the stannous fluoride dentifrice and the control group. It is difficult to explain why the difference in the DMF surfaces of the two groups during the third year is equal to the sum of the differences for the two years of the experiment. It is important to observe that the caries rate increased for both groups after regimented brushing and careful instruction in home care were stopped. The increase

in DMF surfaces during the third year was greater in the control group than in the experimental group which had previously used the fluoride dentifrice. This increase in caries rate after the experiment is in keeping with the results of my experiment which indicated that all of the children have a lesser incidence of caries resulting from the conditions of experimental procedures.

CONCLUSIONS AND SUMMARY

It is evident from these two experiments, as well as others in the past, that one method which contributes to the control of caries is a regimented or carefully supervised oral hygiene program in school children. Regardless of the possible value of a dentifrice with therapeutic effect, methods of instruction and supervision in oral health contribute to the control of the dental caries rate.

The studies reported here cannot be compared, one with the other. They must be considered as separate and individual experiments. Although all of the tests used a fluoride dentifrice, there have been some variations in formulas, age groups and supervision of brushing, as well as differences in group susceptibilities. Some studies showed statistically significant reduction of caries and others did not. The one thing that is constant is that all of the studies have shown some degree of control of caries.

It is difficult to conduct duplicate clinical experiments in dental caries control. There is considerable variation in the susceptibility of different groups which might make some groups more difficult to control. For instance, the Jordan control group of 257 children, ages 8 to 11, entered the experiment with a mean average of 6.24 DMF surfaces per child. My control group of 187 children, ages 9 to 16, entered the experiment with an average caries experience of 10.45 DMF surfaces per child. The children in my study started the experiment with a caries experience 40 per cent higher than Jordan's and developed 40 per cent more caries during the first year of the experiment.

This illustrates one of the reasons that each test must be considered as an entity and not compared with other tests that are made under different conditions. Although the tests reported here had other differences, such as differences in pH and binders, differences in the subjects and in methods of the examiners are more important.

For these reasons the exact evaluation of these experiments must be an individual appraisal. That results of all of the tests of the fluoride dentifrice are on the positive side, even though some are not statistically significant, lends credence to the value of this form of topically applied fluoride. Perhaps there is a tendency to compare the benefits of fluoride dentifrices with the benefits known to result from water fluoridation, instead of comparing the dentifrice with other forms of topically applied fluorides.

Riverview Road, Route 82.

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Calcification of the human deciduous teeth

Bertram S. Kraus, Ph.D., Seattle*

Results of an examination of 95 human fetuses indicate that textbooks in the fields of dental anatomy, histology and embryology have erred in assertions relating to three concepts pertaining to the calcification of the human deciduous dentition. It has been found that: (1) initial calcification begins in the deciduous central incisors as early as 12 weeks or as late as 16 weeks; (2) the sequence of initial calcification is rigid, and does not run in regular sequence from the central incisor to the second molar, and (3) there is no evidence for more than one center of calcification either for the deciduous incisors or cuspids.

An almost universal characteristic of textbooks in the fields of anatomy, histology and embryology is the occasional pronouncement of doctrine without the supporting evidence, or the repetition of undocumented statements as facts. In some instances statements are presented as facts without even reference to the original sources. In this way errors may be perpetuated, unchallenged, through many editions and in texts by other authors. The purpose of this paper is to select some of the so-called facts that survive through a "cumulative process" and to challenge them in the light of new evidence. This examination is confined to some of the phenomena pertaining to the calcification of the human deciduous dentition.

In their study of the development of the permanent dentition and surrounding structures, Logan and Kronfeld[1] pointed out that with respect to the time and sequence of calcification, textbooks in current use at that time on dental histology (Noyes and Bödecker)

> . . . refer the reader to a table compiled by Legros and Magitot in 1893. This table contains many incorrect data, but in spite of this fact, the table has for four decades been copied, without modification, by accepted authorities on histology.

Logan and Kronfeld then proceeded to pinpoint the errors and to establish new standards based on new evidence.

With reference to the deciduous dentition the same comment may be repeated. Modern textbooks (Noyes' *Oral Histology and Embryology,* seventh edition;[2] Kronfeld's *Histopathology of the Teeth and Their Surrounding Structures,* third edition;[3] Orban's *Oral Histology and Embryology,* fourth edition,[4] and so forth) contain tables or diagrams indicating the time and sequence of calcification of the deciduous teeth. Again, as was the case with the permanent dentition, the source appears to be Legros and Magitot.[5]

It is of little significance to trace the history of repetitive error, but a single example will suffice to illustrate the proc-

ess of accretion. Schour and Massler[6] presented a table entitled "Chronology of Growth of Human Teeth" which outlined the ontogenetic development of the deciduous as well as of the permanent dentition. It is indicated that this table is modified after Logan and Kronfeld.[1] Examination of the Logan and Kronfeld paper reveals no reference whatsoever to the development of the deciduous teeth. With regard to the beginning of apposition of enamel and dentin in the deciduous teeth, Schour and Massler stated that the earliest calcification occurs in the central incisor and proceeds "in regular sequence (4 to 6 months *in utero*) from central incisor to second molar."[6] They based their conclusions on roentgenographic findings but cautioned that "since the x-ray film is a record of density, the stage of tooth development as indicated in histologic sections will be slightly earlier than that indicated by the x-rays." In the 1880 English translation of Legros and Magitot[7] a table similar to that of Schour and Massler indicates that calcification begins in the anterior deciduous teeth at 16 weeks *in utero* and occurs in the molars at 17 weeks. Legros and Magitot based their conclusions about the onset of calcification on sections from a single fetus.

It is appropriate that time and sequence of calcification of the deciduous teeth be re-examined on the basis of a more exact technic and a larger sample.

There are, in addition, other statements made on the subject that have passed as facts for many years. Schour and Massler asserted:

> The anterior teeth are formed from coalescence of three growth centers lying mesiodistally and with the lingual cingulum raised up into the beginnings of a fourth growth center. In the cuspid the intermediate of the three growth centers lies above the others, while in the incisors all three centers occupy approximately the same level.[6]

In an earlier paper[8] they stated:

> The dentino-enamel junction or blueprint pattern of the tooth form is characterized by definite high points upon its surface which correspond in number and position to the cusps (in the posterior teeth) or lobes (in the anterior teeth) of the completed tooth. . . . These, the appositional growth centers of the tooth (formerly called calcification centers), are characteristic, in number and position, of the form of the tooth. Cellular activity begins at these points at a maximal velocity and spreads peripherally at rhythmic daily intervals along the dentino-enamel junction like the ripple caused by a pebble thrown into calm water.

A final quote on the subject from the same authors[6] follows:

> It has been observed in the study of roentgenograms that the teeth begin to calcify at individual "calcification centers," which gradually extend peripherally, approximate each other and fuse to form the morphologic outline of the tooth. . . . In the posterior teeth, one calcification center has been observed for each cusp. In the incisor teeth, three calcification centers have been observed, corresponding to the three mamelons and lobes found on these teeth. Observations on the cuspid tooth have been inadequate, but it has generally been thought that it too had three calcification centers, a fourth center sometimes occurring at the cingulum.

Since at no time do the authors differentiate between deciduous and permanent teeth, it is obvious that they consider multiplicity of calcification centers to be characteristic of all the anterior teeth.

Scott and Symons[9] stated that "calcification commences in the separate cusps and in separate sites along the incisive edges of the teeth" without indicating the number of sites or whether or not this applies to both deciduous and permanent teeth. Wheeler,[10] speaking of all the teeth in general, made the following statement:

> Apparently there are four or more *centers of formation* for each tooth. The formation of each center proceeds until there is a coalescence of all of them. Each of these centers (when one is speaking of the crown portion) is called a *lobe*.

It is apparent, in his discussion of the lobes of the permanent anterior teeth, that Wheeler knows of no direct evidence (nor is any reference given) for the concept of three or more separate centers of calcification. As he puts it,[11] ". . . *ob-*

Table 1 • Standard for estimating age of fetus (modified from Patten)

Age (weeks)	Crown-rump length (mm.)
8	18- 35
9	36- 46
10	47- 58
11	59- 71
12	72- 85
13	86- 99
14	100-113
15	114-127
16	128-141
17	142-154
18	155-167

servation of all aspects *proves* the development of each tooth crown to be a combination of four lobes or more. Each lobe represents a primary center of formation" (italics mine).

The fact remains that in none of the works cited previously was there a single reference to any direct evidence, roentgenographic, histologic, or otherwise, of multiplicity of calification centers in either the deciduous or permanent anterior teeth. It is appropriate, therefore, to re-examine these statements in the light of direct observations on developing deciduous teeth.

There are, then, three major claims concerning the calcification of the deciduous dentition which will be discussed in this paper. They may be generally formulated as follows:

1. Calcification of the deciduous dentition begins at four months *in utero*.
2. Calcification proceeds in regular sequence from central incisor to second molar.
3. Enamel formation in the incisors begins from three calcification centers.

MATERIAL AND METHOD

A series of 95 human fetuses ranging in age from 8 through 18 weeks was cleared and stained with alizarin red S, using a modification of the method of Noback and Noback.[12] The maxillary and mandibular bony crypts were then explored, using a Cycloptic Stereoscopic Microscope with a 15X eyepiece; whatever teeth were present were removed. The mesiodistal dimensions of the enamel crowns were recorded, using a micrometer disk inserted into the eyepiece. Accuracy up to 1/50 of a millimeter was indicated by repeated measurement of random samples.

The staining technic was preferred to roentgenography since the latter does not detect the earliest formations of calcified material, as pointed out by Noback.[13] The likelihood of missing calcified cusps (Logan and Kronfeld),[1] even though very minute, is overcome by the use of magnification up to 80X and by careful probing of the crypt with micro-dissecting instruments.

Age of the fetus was estimated by the use of crown-rump length, according to the standards shown in Table 1 (modified from Patten[14]).

RESULTS

Time of Initial Calcification • Of the 95 fetuses examined, none of those under 86 mm. crown-rump length (13 weeks) showed any signs of calcification in any of the teeth. In other words, before 13 weeks *in utero* there was no direct evidence of initial calcification.

In each successive age group beginning with 13 weeks, the proportion of those in which calcification had not yet commenced steadily decreased. After 16 weeks no fetuses were found without some evidence of calcification. The distribution is shown in Table 2.

Measurement of the maximum mesiodistal diameters of the calcified portions of the crowns of the maxillary central incisors indicated that in 3 of the 13-week-old-specimens, initial calcification must have taken place at least a week previously, that is, during the twelfth week. It seems clear, therefore, that initial calcification may take place at any

Table 2 • Distribution of fetuses according to calcification of teeth

No. fetuses examined	Age (weeks)	Percentage fetuses with undecalcified teeth
22	13	73.0
14	14	50.0
14	15	14.0
11	16	9.1
10	17	0.0
9	18	0.0

time from the twelfth through the sixteenth week, with a mean initial calcification age of 14 weeks or 3½ lunar months. The often-repeated assertion that this event takes place at four or four and a half lunar months is in error. What is more, a mere statement of a mean or average time of initial calcification without indication of a range of variation in terms of standard deviation is useless and often extremely misleading.

Statistically, as will be shown later, the last tooth to commence calcification is the second molar. According to Noyes' Table 4,[15] the first evidence of calcification of the second molar is in the sixth month *in utero*. However, one fetus of 14 weeks, another of 15 weeks, and two of 16 weeks, showed second molars in which calcification had already begun. By the eighteenth week 20 to 30 per cent of the fetal population showed second molars in varying stages of calcification. It is impossible, on the basis of this present sample which contains no specimens older than 18 weeks, to determine that age at which all fetuses will have begun calcification of the second molars. It seems doubtful, however, if this age would be greater than 22 weeks or five and a half lunar months. The initial calcification of the second molar, then, is extremely variable, beginning in some few instances as early as 14 weeks or three and a half lunar months and ranging through perhaps five and a half months. The mean age at which initial calcification occurs cannot be calculated on the basis of this sample, but may be estimated as 19 or 20 weeks.

In summary, initial calcification of the deciduous dentition is highly variable in time. It may commence as early as the twelfth week or latter part of the third lunar month in the maxillary central incisor, or delay as late as perhaps the twenty-second week or middle of the fifth lunar month in second molars. There is no fixed time of initial calcification for any particular tooth; rather, each tooth has its own specific temporal span during which initial calcification may take place. This is contrary to the assertions found repeatedly in the dental literature.

Sequence of Calcification • Of the total sample of 95 fetuses, 54 were in some stage of tooth calcification. These were classified according to which specific teeth were calcified and which were not. It was found that only five categories were needed to accommodate 53 of the 54 specimens. These categories and the number of specimens in each are shown in Table 3. The only exception was one fetus of 15 weeks in which only the central incisor and one lateral incisor showed evidence of calcification.

Table 3 indicates clearly that there is the following definite sequence of initial calcification:

1. Central incisor.
2. First molar.
3. Lateral incisor.
4. Cuspid.
5. Second molar.

Table 3 • Classification of fetuses with tooth calcification, according to teeth calcified

Teeth in calcification stage	No. fetuses
Central incisors only	7
Central incisors and first molars only	12
Central and lateral incisors and first molars only	17
Central and lateral incisors, first molars and cuspids	8
All five teeth	9
	53

The often-repeated statement that earliest calcification proceeds "in regular sequence from central incisor to second molar" is therefore in error.

If it is assumed that the rate of calcification is the same for both upper and lower central incisors, then that crown which has the greater mesiodistal diameter would have been the first to begin calcification. In the 43 specimens in which both upper and lower central incisors were in the process of calcification 42 showed greater mesiodistal crown diameters for the upper central than for the lower central incisors. The exception had a lower central incisor which was 0.08 mm. larger than the upper. Of the remaining 11 fetuses, 10 had only the upper central incisors in a calcification stage whereas 1 showed only a lower central incisor calcified.

In a similar way it can be demonstrated that the usual condition is for initial calcification to occur in the upper lateral incisor before the lower lateral incisor, and in the upper first molar before the lower first molar. However, no clear-cut differentiation in precedence of initial calcification could be made between upper and lower cuspid or between upper and lower second molar. For example, there were two specimens in which only the upper cuspids were calcified and 1 in which only the lower was calcified. On the other hand, of the 14 fetuses in which both upper and lower cuspids were in the process of calcification, 11 (or 79 per cent) had lower cuspids which were greater in mesiodistal crown diameter than the upper cuspids. Again, if equivalent rates of growth are assumed for both upper and lower cuspids, this observation is evidence that the lower cuspids might be slightly earlier in their initial calcification than are the upper cuspids.

Enamel Formation in the Incisors • I have already quoted Schour and Massler to the effect that in the incisors "three calcification centers have been observed" which correspond to the "three mamelons and lobes found on these teeth." In the third edition of Kronfeld's text[16] is found the statement, attributed to de Jonge-Cohen: "Normally an upper central incisor develops from three calcification centers, namely, a mesial, a central, and a distal marginal tubercle; these three tubercles are still visible at the time of eruption." Hutchinson's incisor is explained on the basis of absence of the central tubercle.

Bolk[17] has constructed a very elaborate theory of evolution of the incisors, based on the premise that the three lobes (*Zähnelappen*) do not merely represent enamel build-up (*Schmelzverdickung*) but rather "this phenomenon, therefore, must be considered as a primary formation tendency of the dental papillae" (*die Erscheinung muss somit in einer primären Bildungstendenz der Zahnpapille wurzeln*). This conclusion is based on longitudinal sections of mature incisors. De Jonge[18] clearly follows Bolk in claiming that the three portions of the enamel crown (mamelons) are consequences of three pulpal horns (diverticula pulpae). According to the German school the three "tubercles" of the incisal margin are evidence of derivation, phylogenetically, from the triconodont structure.

Much of the existing thought on the evolution of the human dentition originated in the days before many of the principles of genetics and the role of heredity in evolution had been formulated. In addition, rather involved reasoning and insight often took the place of factual and experimental substantiation. Orthogenesis was often a guiding principle, recognized or not. This is not the place to discuss critically the tradition-bound concept of the evolution of the human dentition. However, a close scrutiny of one of the accepted "facts" on which a portion of the concept is based may well raise some doubts about its general validity. Do the deciduous

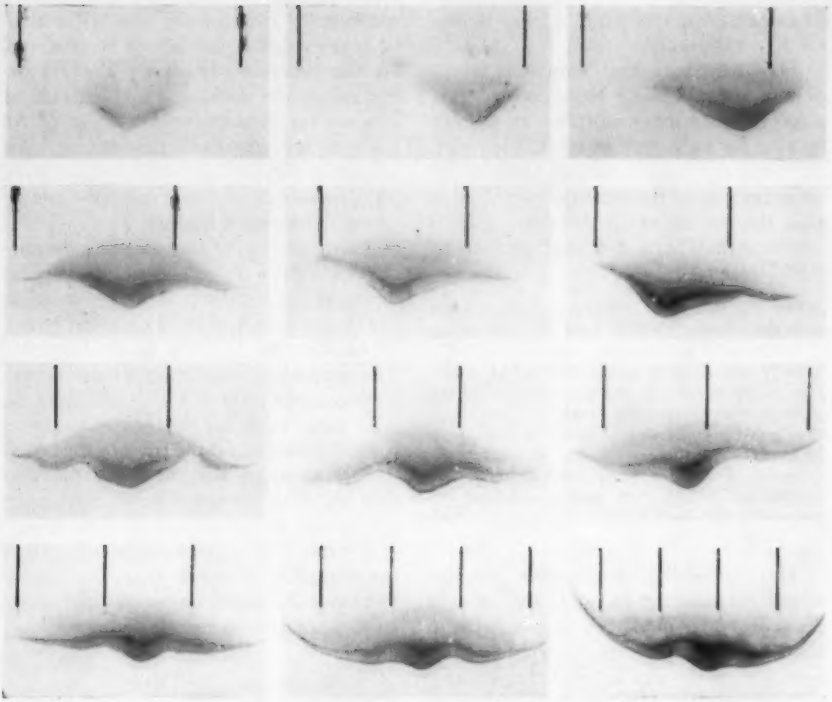

Fig. 1 • Calcification of deciduous maxillary central incisors. Distance between each marking is 1 mm. Absolute mesiodistal diameters are (in millimeters):

.29	.48	.77
1.28	1.36	1.41
1.86	1.99	2.32
3.02	3.61	4.20

incisors grow from multiple calcification centers?

Almost 200 central and 126 lateral deciduous incisors in various stages of calcification were observed. Measurements were made of the maximum mesiodistal calcified diameters of the crowns. The smallest incisors observed were 0.27 mm. in width, the largest 4.28 mm. The latter measurement is close to the maximum mesiodistal diameter of the incisal edge of the completed crown of the deciduous upper incisor.

In not a single instance out of the 326 teeth was more than one center of calcification observed. Examination of the teeth from smaller to larger dimensions (Fig. 1) reveals that a single calcification center forms midway in the mesiodistal plane. From this center the dentinoenamel junction spreads in both directions. The enamel formation is preceded slightly at any point by dentin. The structure of the enamel at various points in time indicates that the ameloblasts are activated in regular sequence from the center toward the mesial and distal peripheries of the tooth. The dentinoenamel junction spreads out from the center and is closely followed first by the dentin and soon after by the enamel. The greatest thickness of enamel occurs at the center

of calcification and diminishes as it proceeds peripherally.

The dentinoenamel junction is, as Schour and Massler[6] have pointed out, a sort of blueprint or morphologic pattern specific for each type of tooth. However, although the enamel overlay takes on the gross pattern of the dentinoenamel junction, the way in which this takes place is not as it has been described by Schour and Massler:

> When the cones or adjacent growth centers with their formative cells enter into the sphere of influence of one another, a fusion of cellular activity occurs so that the succeeding incremental layers take on the gross outline of the dentino-enamel junction itself. . . . When the growth centers are closer together, as in the incisors, the ameloblasts do not become crowded. Fusion is early and more nearly complete. The different centers are here demarcated only by the mamelons and the shallow labial grooves. . . .[6]

The underlying biochemical processes which activate the enamel-forming cells are not understood, but it would seem that these processes are intimately connected with the extension of the dentinoenamel junction from the original center of calcification. The thicker the enamel layer becomes, the less the occlusal surface of the crown resembles the underlying dentinoenamel junction.

The mamelons cannot be vestiges of centers of calcification since there is only one center of calcification in each deciduous incisor. They simply mark the sites of depression in the dentinoenamel junction which are roughly duplicated by the overlaying deposition of enamel. The disappearance of the mamelons is a function of wear and abrasion after eruption of the tooth. Variability in the morphological characteristics of the dentinoenamel junction would be expected, as in all biological traits, and indeed it is observed. There are usually three distinct elevations but they may vary in height and in spatial interrelationship. The depressions may be more or less marked (Fig. 2). If the depressions in the junction are slight, they are covered over by the enamel so that no mamelons or lobes are to be observed on the occlusal surface of the crown. Indeed, in the deciduous incisors mamelons are rarely observed (Wheeler).[10] At any rate, regardless of the number of high points in the junction or the depths of the depressions, there is only one center where calcification begins.

Thirty-two upper and 30 lower deciduous cuspids were observed in varying stages of calcification. Contrary to what has been claimed, there is only one center of calcification in these teeth (Fig. 3). The mesiodistal diameters of the recovered cuspids ranged from 0.23 mm. to 1.70 mm. They are easily distinguished from the incisors on the basis of the much steeper slope of the cusp and the fact that the dentinoenamel junction consists of but one elevation and no depressions. It is difficult to understand on what basis the assertion is made that the cuspid (whether deciduous or permanent) arises from three growth centers.

CONCLUSION

A perusal of texts on dental histology, anatomy and embryology reveals that a number of statements concerning the phenomenon of calcification of the deciduous dentition have been presented as facts without adequate evidence or without critical evaluation of the somewhat ancient sources from which they have been copied. This paper has focused in particular on the following three concepts that have become accepted without challenge.

1. Initial calcification of the deciduous teeth commences at four or four and a half lunar months and concludes at six lunar months.

2. The deciduous teeth begin calcification with the central incisor, and the remaining teeth follow in regular sequence from the central incisor to the second molar.

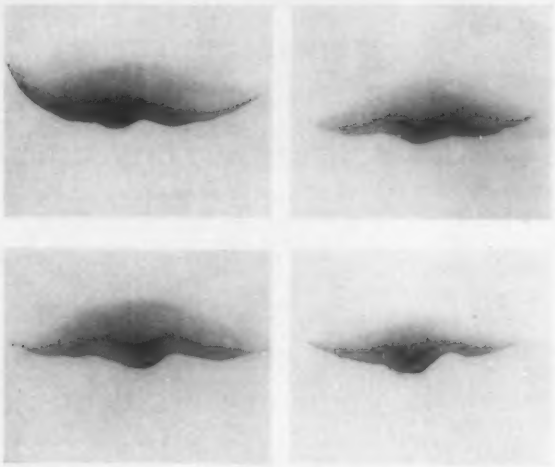

Fig. 2 • Morphological variation in dentinoenamel junctions of deciduous maxillary central incisors

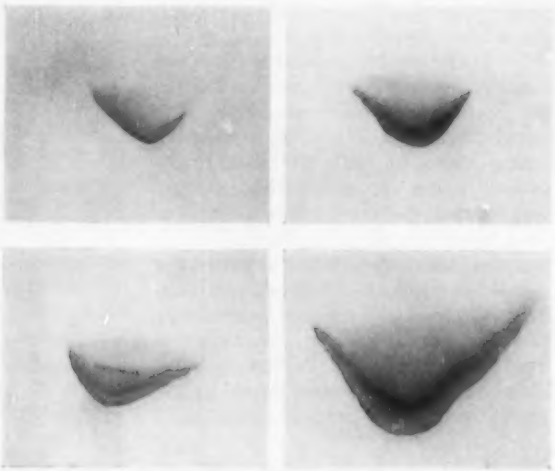

Fig. 3 • Calcification of deciduous maxillary cuspids. Absolute mesiodistal diameters are (in millimeters):

.44 .61

.86 1.26

3. The incisors and the cuspid have three centers of calcification corresponding to the three mamelons or lobes which are visible on the crown surface at the time of eruption.

An examination of 95 human fetuses cleared and stained with alizarin red S has indicated that these three concepts are incorrect. It has been found that:

1. Initial calcification begins in the deciduous central incisors as early as 12 weeks or as late as 16 weeks.

2. The sequence of initial calcification is extremely rigid, beginning with the central incisor and followed by the first molar, the lateral incisor, the cuspid, and the second molar, in that order. In addition, the maxillary tooth commences calcification before the mandibular in the case of the central and lateral incisors and the first molar. But the lower cuspids tend to calcify slightly earlier than the upper cuspids. The upper and lower second molars apparently begin calcification simultaneously, as far as the evidence available indicated.

3. There was no evidence for more than one center of calcification either for the deciduous incisors or cuspids. The morphological relationships of enamel, dentin and dentinoenamel junction in various stages of calcification strongly suggest that the ameloblasts are stimulated to activity along the dentinoenamel junction in a gradient extending from the center of calcification mesially and distally, and enamel formation lags slightly behind dentin formation. The lobed appearance of the incisor crowns on eruption is a function of the depth of the depressions in the dentinoenamel junction. The deeper the depressions, the more pronounced the fissures in the enamel surface directly overlying them.

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*Professor of physical anthropology, department of orthodontics, School of Dentistry, University of Washington.

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Perception • Men in general judge more from appearance than from reality. All men have eyes, but few have the gift of penetration. *Machiavelli.*

Temporomandibular joint disorders

Frank M. Kyes, D.D.S., Great Lakes, Ill.*

Twenty patients suffering from disorders of the temporomandibular joint were treated by correcting their occlusions; this involved the reduction of cuspal inclines that were causing mandibular displacements. All 20 patients received complete relief, generally within 24 to 48 hours. Occlusal corrections were made only in the centric position. A new procedure for the analysis and correction of traumatic occlusion utilizes a check-bite made of white alginate; interfering cusps are located by a study of the perforations in the check-bite.

Patients suffering from disorders of the temporomandibular joint and associated muscles and ligaments have numerous complaints, but probably the most urgent is the combination of pain, trismus and occasional swelling. This article is a general discussion of the history, complaints, clinical findings, treatment and postoperative results recorded for 20 consecutive patients whose chief complaint was pain in the temporomandibular joint and the muscles of mastication. Coupled with this discussion are comments on traumatic occlusion and a new procedure for its analysis and correction. It seems correct to believe that this group of patients constitutes a fair cross section of the average sufferers from so-called temporomandibular joint disorder and that the observations presented here are applicable to the vast majority of persons who seek help for such an ailment.

HISTORIES

The 20 patients were men and women, most of whom were Caucasian, ranging in age from 18 to 47 years. None had a history of a blow or similar injury and none had a medical history of arthritis. Some had extended histories of clicking joints and mild subluxations. All had a history of pain varying in duration from a few days to months and years. Several had had roentgenographic examinations, as well as occlusal corrections or injections of various drugs into the joint, or both. One presented a complete case report written by a competent civilian oral surgeon with the conclusion that an ankylosis was inevitable and a condylectomy was the treatment of choice in the near future.

CHIEF COMPLAINTS

Most of the patients made an early report of mild pain during mastication and some stiffness in the temporomandibular joint on arising in the morning. The pain usually centered in the joint and in several instances was noticeable in the inser-

tion of the masseter muscle near the angle of the mandible or in the temporal muscle. These patients had been troubled for only a few days. Some had a pronounced clicking in the joint. Four others had trismus which prevented them from opening their mouths more than an inch, with a history of months or years of such difficulty. These patients were, at times, in acute pain. Two had such noticeable swelling when referred, that they were labeled suspected cases of unilateral parotitis. Two were referred by a psychiatrist because of associated symptoms of moaning and bruxism during sleep. One, in addition to a known and previously treated joint disorder, was the victim of violent headaches which kept him awake at night. One, in addition to joint pain, had severe neck pains that caused her physician to take roentgenograms of her cervical vertebrae for arthritis.

CLINICAL FINDINGS

Most of the patients had more or less complete dentitions, several had suffered extensive loss of teeth, and one had a maxillary denture which was of such remarkable stability that it functioned almost like an arch of natural teeth. When examined, all the patients proved to have occlusal discrepancies. These interfering cusps produced mandibular displacements which ranged from anterior movements of 1 or 2 mm. to unmeasurably minute, lateral displacements that must have measured just a few thousandths of an inch. There were several high restorations that might or might not have been the original cause of trouble. Three patients had submarginal fillings which had allowed the sharp mesiolingual cusp of an upper second molar to drop down into what was essentially a vertically walled, unfilled ditch in the enamel of its opposing lower tooth. A distinctly submarginal restoration opposed by a sharp cusp may be just as troublesome as a filling in hyperocclusion.

TREATMENT

The occlusion of all the patients was corrected; this involved the reduction of cuspal inclines that were causing mandibular displacements. The analysis for the selective grinding[1] was provided by an interocclusal alginate check-bite which will be described in detail later. All patients were told to remain on a soft diet for a few days but, generally, this was already a self-imposed procedure because of pain. Hot, moist packs were recommended for 20 minutes every two hours until improvement in the symptoms developed.

It should be noted that occlusal corrections were made only in the centric position and not in eccentric or nonfunctional positions. Why the correction of centric inequalities appears to be more important than eccentric is problematic. One might surmise that the jolt received by the joint and muscles is more pronounced in centric relationship because the mandible is more nearly in a static position at the end of the chewing cycle. An interfering cusp in a balancing or working position would transmit the shock while the condyle and muscles were active and in movement. Possibly, in a manner of speech, they roll with the punch and are not jarred.

POSTOPERATIVE RESULTS

One enthusiastic patient reported that he "felt better immediately" after his occlusal correction. This might best be considered a psychosomatic benefit. Most of the patients reported complete relief within 24 to 48 hours and, oddly enough, this was true of patients who suffered from the most acute symptoms. Several extended their recovery over a few days. One, a particularly neurotic woman, offered a guarded prognosis for a period of weeks, but finally, in the words of her husband, "appeared to have completely forgotten her trouble after two months."

Two of the patients who were slow to recover were given a second occlusal adjustment. Whether the first adjustment was insufficient, or whether the teeth shifted or muscle spasms relaxed after cuspal reduction, or both, is problematic. All of the patients were at least temporarily cured of their symptoms of pain, trismus and swelling. Because of the military transfer of either the author or his patients, none of these can be considered as more than "two-year cures." Despite this, there was great consistency in the benefits.

GENERAL COMMENTS

Roentgenograms did not play a part in the diagnosis of this group of patients. Those films which the patients brought with them were difficult to evaluate. The accompanying case reports indicated a tendency for operators to read into the films conditions that they expected to find. Had any of the 20 patients given a history of blows or similar injuries, roentgenographic examination would have been made. In order to save needless hours of roentgenographic work, a good rule is to assume that the occlusion is guilty until proved innocent. Then, if improvement does not result from occlusal correction, the roentgen ray should be used in search of osseous spurs, sclerosis, fibrosis, old fractures, hypoplastic condyle, malignancies or other disturbances.

It is of interest that some of the patients with histories of long-standing trouble had already had their occlusion corrected. However, none of them had ever had the adjustment made with alginate check-bites used as the method of analysis. Their resistance to previous treatment may have arisen from the fact that the original analysis was not delicate enough to indicate occlusal trouble.

The occlusal discrepancies (unsatisfactory initial contacts impeding centric occlusion) of this group followed the usual pattern observed by any student of occlusion. By far the most common interference existed between the upper and lower first bicuspids with a resultant anterior displacement of the mandible. Such a discrepancy is readily diagnosed by the presence of a noticeable facet on the "forward-looking" slope of the lingual cusp of the upper first bicuspid. It undoubtedly occurs in this region because of the exceptionally steep cusps of that tooth. This particular type of discrepancy frequently causes a very noticeable anterior displacement amounting to 1 or 2 mm. Other commonly encountered forward thrusts were caused by tilted lower second molars and overerupted upper third molars (Fig. 1).

VERIFICATION OF UNSATISFACTORY INITIAL CONTACTS

Unsatisfactory initial contacts can be readily verified. The dentist grasps the patient's chin between his thumb and forefinger and has the patient protrude and retrude his jaw repeatedly with his teeth just out of contact. Then, when the jaw is completely retruded, the patient is asked to close gently until the first tooth touches. He will immediately become aware that certain teeth block a complete closure. As a general rule, he will also charge the dentist with "pushing my jaw back too far." What actually has happened is that he is accustomed to closing with his jaw too far forward, as he unconsciously tries to avoid an interfering cusp. This, then, is the first check when an interfering cusp is suspected. "Forward, back; forward, back; forward, back; —now close gently—does any tooth hit before the others?" In this group of 20 suffering people, the answer was invariably, "Yes."

LATERAL DISPLACEMENTS

Thus far, only anterior displacements have been discussed. There are other equally harmful discrepancies which tend

Fig. 1 • Mandibular view of alginate check-bite, showing perforation on distal aspect of lower right second molar, caused by overerupted, unopposed, upper third molar. This occlusal defect is a common cause of anterior displacement with, among other effects, frequent traumatic effects on supporting tissues of anterior teeth, which are pounded in the forward thrust

to force the jaw in a lateral direction. They are generally more minute discrepancies which exist within the fossae of upper teeth or on the lingual surface of an upper cuspid or lateral incisor. These, like the anterior displacements, are best analyzed by using the alginate check-bite which is to be described later (Fig. 2).

The anterior displacements are generally more acute and are corrected by opening embrasures or widening transverse grooves. The lateral displacements are sometimes minute and are corrected by widening the central fossae or grinding the lingual surfaces of cuspids or lateral incisors. Occasionally, the slight touch of a stone to a cuspal incline will result in the elimination of pain and trismus. The vertical dimension is not closed by selective grinding; the operator simply grinds on one side until tooth contact is made on the other side without a slide as final tight closure is made.

As might be suspected, pain usually occurs in the joint opposite to the side of the discrepancy. In other words, it is on the side toward which the mandible is being forced. There is no proportional relationship between the amount of the discrepancy and the severity of the symptoms. Probably this is because a patient can, through his tactile senses, actually place his jaw into a convenient closure when a gross discrepancy exists. Eventually this becomes a pattern. However, with a very slight discrepancy, the patient probably is not able to make the minute accommodation needed to eliminate the jar and jolt continually transmitted to the joint and associated structures.

The expression "mandibular malposition" means that the course and destination of the mandible, as determined by the muscles of mastication, are misdirected because of inclined planes of teeth. If such a lack of harmony exists, a situation described by a host of terms, such as occlusal disharmony, interfering cusps, cuspal prematurities, premature contacts, occlusal discrepancies, and so forth, exists.

When teeth and muscles are in harmony, the proper destination of the closing mandible is centric jaw relationship. If teeth and muscles are not in harmony, one of two things can happen. If a tooth

Fig. 2 • Mandibular view of check-bite, showing perforation on lingual slope of buccal cusp of lower left second molar. This caused lateral displacement of the mandible toward the left and is the type of discrepancy likely to cause joint disturbances on opposite side of the arch. "Near misses" indicated by darkish areas on buccal slopes of right mandibular teeth indicate that additional teeth must be reduced by grinding before lateral thrust can be eliminated

interferes with the normal closing arc of the mandible, and if the mandible gets to its proper destination, there is what is called a centric interference. The course is misdirected but the destination correct. However, if teeth force the jaw from its proper course and destination (centric jaw relationship), there is what is known as an acquired centric or a convenience centric relationship. Whether the interfering tooth misdirects only the course of the mandible or precludes the arrival at the proper destination, the result will be jarring and jolting to the joint and musculature. Since minute but continual impact will cause pain to susceptible patients, a very delicate method of disclosure is desirable.

The alginate check-bite to determine occlusal discrepancies is easy to make and easy to analyze. After the patient has been guided by manual manipulation until he is aware of his own occlusal discrepancies and after any obvious gross cuspal interference has been reduced, the patient is ready for a check-bite. A mix of alginate is made and pencil-sized rolls are placed over the occlusal surfaces of the lower posterior teeth. A cement spatula is used to place the alginate on the teeth. Another alginate roll is laid transversely across the incisal edges of the lower teeth. The patient is told to raise his left hand just as he feels the first slight tooth contact. The lower jaw is then pushed firmly in a posterior direction, and the patient is instructed to begin to close very gently. The jaw is jiggled posteriorly until the patient's teeth are almost in contact and then the pressure is completely released and the patient allowed to close until he makes a gentle tooth-to-tooth contact. When his left hand comes up, he is told to hold the position with a very, very slight pressure.

An alginate check-bite is most preferably made of a white alginate. It can then be placed in water in a black plaster bowl and "read" easily. It actually constitutes a pair of study models except for the fact that the viewer is on the inside looking out, so to speak. The dentist has before him an intaglio of the occlusal third of both arches, and is able to locate interfering cusps by the perforations in the material. If the patient has a displacement, the perforations, if multiple, will be on cuspal inclines which face in the same direction. Then, knowing the inclines to be reduced, the dentist can use articulating paper in the knowledge that he will ignore all markings except those which correspond to the perforations in the check-bite. When using articulating paper as an adjunct to the check-bite, I generally insert the paper and then chatter the patient's teeth by jiggling his jaw up and down manually. When one uses articulating paper with prior knowledge of where the discrepancies actually are, he becomes conscious of what a misleading diagnostic tool articulating paper is in itself. The so-called "bull's eyes" (points of heavy contact) frequently are not on the actual offending cuspal inclines, as proved by the alginate check-bite. The offending inclines, as proved by the check-bite, frequently appear as inconsequential smears if one were judging the articulating paper markings on their intensity. Articulating paper is about 0.003 inch thick. Since the posterior teeth are closer to the closing axis than the anterior teeth, they will impinge on the articulating paper prematurely despite the fact that the occlusion may be in equilibrium. In the 20 patients under discussion, articulating paper was used as a visual guide, but only as an adjunct to the alginate check-bites and in full knowledge that articulating paper is deceptive when used alone.

A desirable characteristic of any jaw relationship record is that it can be duplicated repeatedly by the operator. This is true of alginate check-bites. If two or three records are made carefully in sequence, they will have identical perforations and thin regions.

Wax check-bites are commonly em-

ployed and were undoubtedly used in the early unsuccessful efforts to treat several of the patients under discussion. Wax may be employed in two ways. The patient may be directed to close into a soft horseshoe of wax or he may be directed to tap against a very thin layer of an exceedingly nonresistant wax. In both instances, perforations supposedly indicate the need for cuspal reductions if a lack of occlusal harmony exists. In the former method, there is the ever-present danger of the mandible skidding slightly because the wax has body and offers some resistance. This is not true of alginate. If one of the exceptionally soft waxes is used, the tapping may displace a tooth sufficiently to allow other surfaces to come into contact. Neither method offers the delicate perfection of an alginate check-bite, nor does it provide the entire, perfectly detailed occlusal intaglio of the alginate check-bite (Fig. 3). It is that complete upper and lower intaglio which enables the operator to visualize so clearly what happened as the teeth first touched and what would happen if biting pressure

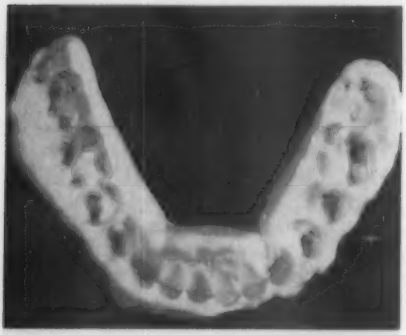

Fig. 3 • Check-bite shows numerous contacts but slight overloading on right side of this mandibular view. Contacts on the mesial and the distal aspects and the buccal and lingual aspects at least assure operator that this patient does not have a forward or a lateral shift as a result of unsatisfactory initial contact. When all the contacts are made on mesial slopes of a single arch or are consistently faced in one direction backward or laterally, pattern of shift resulting from unsatisfactory contact can be easily visualized

Fig. 4 • Mandibular view of check-bite, showing single perforation with numerous "near misses"

were increased to produce a slight slide into full occlusion.

Mounted models present so many obvious possibilities of errors and such poor visualization that they are not considered to be of diagnostic value when compared with the accuracy and visualization provided by alginate check-bites (Fig. 4). By noting the thin regions in the alginate check-bite, the operator can plan a grinding pattern similar to the grinding plan advocated by users of mounted models; and the more accurate alginate check-bite can be made in about a hundredth of the time required for a mounted model. The operator who uses check-bites tells the patient which tooth is striking; the operator who uses other methods must ask the patient which tooth is striking.

These observations regarding the efficiency of alginate check-bites should be of interest to the general practitioner and to specialists. It is important that the general practitioner have a fast, accurate and efficient method to treat patients with joint disorders. The prosthodontist should be interested because he has many joint disorders referred to him. The oral surgeon should always give occlusion strong consideration lest he find himself treating the results of a disorder without removing the causative factor.

The orthodontist should be interested

because it is important that a patient does not end up biting in a convenience or acquired centric position. The periodontist should be interested because, although occlusal discrepancies may not be the primary etiologic factor in periodontal lesions, they often are worth secondary consideration.

CONCLUSIONS

The observations tend to confirm the opinion of many dentists and orthopedic surgeons that the occlusion of the teeth provides the most common etiologic factor in temporomandibular joint disorders. It is felt that the unusually consistent benefits derived from the use of alginate check-bites indicate that most joint disorders are the result of occlusal disharmonies transmitting torque to the joint, or jolts and jars to the muscles of mastication.

In view of the uniformly good results obtained by this conservative method, one might well question the frequent initial need for such drastic measures as injection of escharotics or hydrocortisone into joints, the injection of procaine into muscles, the immobilization of the mandible with wiring or elastics, and the construction of extensive occlusal rehabilitations or splints. Obviously, all have occasional value.

It appears that failure to correct the majority of joint disorders through occlusal corrections stems from a failure of the technic employed rather than the procedure itself. It appears also that occlusal correction will cause a cessation of pain, trismus and swelling in all but a very small fraction of the type of patients under discussion. I feel that wax bites, articulating paper and mounted models are not sufficiently delicate to make the desired registrations, and that much benefit would be derived from a general acceptance of the alginate check-bite method described and recommended here.

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

*Captain, Dental Corps, Dental Department, Ad. Com. U.S. Naval Training Center, Great Lakes, Illinois.

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History • It is perfectly easy to define historical science, or at least to offer a definition of history. Historical science is the art of collecting, arranging, interpreting and publishing the evidence of history, and thereby establishing "what actually happened." This is an important task, and it is also an essential task. A historian who thinks he can dispense with it does not deserve the name of historian. We should not cease to respect the great historical scientists of the last century who really did their work so thoroughly that often it need not be done again. But the fact remains that this is not the whole of history, and people nowadays recognize that it is not. *Hugh Trevor-Roper, The Listener.*

Auditory analgesia in dental operations

Wallace J. Gardner, D.M.D., and J. C. R. Licklider, Ph.D., Cambridge, Mass.*

A new approach to dental analgesia is provided by the Audio Analgesiac, a stereophonic machine with earphones for both the patient and the dentist. The patient selects either a masking sound or music, and can control the volume of sound. Used in cavity preparation and scaling and grinding operations on 387 patients who had always required a local anesthetic or gas, the Audio Analgesiac produced completely effective analgesia in 63 per cent. Extractions have been made in 119 patients with the aid of only the Audio Analgesiac. The machine reduces or eliminates unpleasantness and pain, and permits about 25 per cent more work to be accomplished in a given period of time. The dentist can start to work at once. By controlling the volume of sound, the patient can communicate with the dentist.

A visit to the dentist's office is regarded by many as an unpleasant experience and by more than a few as a painful ordeal. To minimize the discomfort and pain of their patients, dentists regularly employ palliatives: local anesthetics, analgesia-producing agents and even general anesthetics. However, the negative affective reaction to dental operations persists despite the widespread use of those agents. The efficiency and effectiveness of dental procedures are still often affected adversely, either by the discomfort of the patient or by undesired effects of the agents used to minimize the discomfort.

In March 1958, we made an observation that led rapidly, though along a somewhat unexpected path, to a rather different approach to dental analgesia. The observation was suggested by the idea that the grinding noise made by the dental drill when it is applied to the teeth acts as a source of anxiety and tension. "Would it not reduce the general unpleasantness of cavity preparation," we asked ourselves, "if a masking sound, strong enough to drown out the sound of the drill, were introduced into the patient's ears?"

INITIAL OBSERVATIONS

The electronic equipment necessary to test the idea was set up: a "random noise" generator, filters, a power amplifier and earphones, to produce a masking sound somewhat similar to the roar of Niagara Falls, and a remote volume control to let the patient adjust the intensity of the masking sound until he could not hear the drill. In the first observation, J.C.R.L. was the patient, and W.J.G. drilled out a large cavity. No conventional anesthetic or analgesic was employed. The patient took the opportunity to turn the masking sound on

and off to observe the effect of the sound upon his affective state. The masking sound did drown out the dental drill, and that seemed to contribute significantly to toleration of the operation. In addition to the reduction of anxiety and tension, however, there was a more direct effect of the masking sound on the pain caused by drilling. Although both patient and dentist were at first incredulous, it was evident that the sound had a direct suppressive effect upon the pain.

The office secretary was immediately pressed into service as patient and observer. This young woman had a history of extreme fearfulness in the dental chair. She had never before had cavities prepared without a local anesthetic or an analgesic. Nevertheless, she agreed to forego the use of conventional agents. She put on the earphones, adjusted the volume of the masking sound and sat quietly through the preparation of three large cavities without appearing to experience any pain. At the end of the session, she reported that she had felt none.

USE OF MUSIC IN COMBINATION WITH NOISE

The masking sound had been selected for the particular purpose of drowning out the noise of the dental drill. It was a very effective masking sound, but not a sound particularly enjoyable to hear for a long period of time. When we began to realize that a certain amount of auditory stimulation was desirable even during parts of the dental operation in which the drill was not used, an addition was made to the equipment. On the basis of previous experience, it was known that music often has a relaxing effect. We therefore incorporated a tape recorder in such a way that the patient could select either music or the random noise and adjust the levels of both as desired. The following procedure was then adopted: After being seated in the chair and receiving instructions, the patient specifies the music he wishes to hear, puts on the headset and adjusts the volume of the music to his satisfaction. As the dentist starts to work, the patient increases the volume of the music and then, if he begins to experience serious unpleasantness or pain as the dentist applies the drill, he turns on the noise and increases its intensity.

A few observations were made of regular patients with the laboratory equipment and the tape recorder. The reports of these patients confirmed the original observations. It became evident that much dental work could be completed entirely without the aid of any analgesia or anesthetic other than that provided by the combination of music and noise under the patient's control.

Several patients who had always required a local anesthetic or an analgesia reported that with the auditory stimulation they did not suffer as much as they ordinarily did in cavity-drilling operations. Several expressed appreciation, also, for the simplification of the circumstances of the operation, for the pleasantness of the music, and for the absence of after-effects of types sometimes experienced after a local anesthetic or gas.

AUDIO ANALGESIAC

The original apparatus was in due course replaced by equipment designed specifically for the purpose. It is called the Audio Analgesiac. An advance was made in this new machine through the incorporation of stereophonic sound reproduction. It was necessary, however, to tone down the normal brilliance of high-fidelity stereophonic reproduction, through earphones. Through continued experimentation, an optimal compromise between the attention-compelling realism of stereophonic presentation and the calming, relaxing influence of slightly muted treble was achieved.

The determination of the optimal spec-

trum for the noise was more difficult than one might suppose. The first observations were made with a "white" noise spectrum, a spectrum having the same noise power in each frequency band of unit width. We soon found that spectrums in which the components above 500 cycles per second were greatly attenuated were judged most pleasant by patients. However, spectrums with strong high-frequency components proved to be more effective in producing analgesia. Our present spectrum represents a compromise between the two desired characteristics.

Results Obtained in Cavity Preparation and Scaling and Grinding Operations • During the last year, the Audio Analgesiac has been used in cavity preparation and scaling and grinding operations on over 600 patients. Of the 600, 387 had always required a local anesthetic or gas. On the basis of the results obtained with the Audio Analgesiac, the 387 can be divided into three groups:

1. 63 per cent of the total, for whom the treatment produced completely effective analgesia.

2. 25 per cent, for whom the analgesia was less than complete, but for whom no other anesthetic was needed.

3. 12 per cent, for whom the treatment was not considered helpful.

The last group includes several patients who chose not to try the Audio Analgesiac. Some of them simply did not like music; others did not like to have the headset over their ears; and a few were so highly sensitive and responsive that they became anxious early in the operation and were transferred to other agents in which they had more confidence.

Children were among those successfully treated with the Analgesiac. Music especially selected for children tends to occupy their attention fully, thus eliminating much of their usual tenseness. With the Analgesiac, it is possible to proceed more rapidly and to eliminate the many recesses ordinarily required with children.

Additional Advantages • The Audio Analgesiac has several effects that are important to the dentist, in addition to the main one of reducing or eliminating unpleasantness and pain:

1. It is not necessary to wait with the Audio Analgesiac, as with a conventional anesthetic or analgesia, for the agent to take effect. The dentist can start to work at once.

2. With adults as well as with children, the Audio Analgesiac accelerates the operation. Both literally and figuratively, it decreases the patient's tendency to get his tongue in the dentist's way. In the case of a tense patient whose tongue interferes physically with drilling, it does this by relaxing him. In the case of a frightened patient who wants to prolong a conversation in order to postpone the drilling, it does this by silencing him. On the average, approximately 25 to 35 per cent more work can be accomplished in a given length of time.

3. The Audio Analgesiac masks the sound of the drill for the dentist (who also wears a headset) as well as for the patient. This is particularly important when the dentist makes frequent use of the high-speed, air-turbine drill, which produces an annoying high-pitched whine.

4. Even in instances in which a local anesthetic is used, the Analgesiac proves itself of value by reducing the tenseness of the patient in anticipation of the needle.

Individual Differences Among Patients • Patients differ widely in their preferences for types of music and in their selections of volume level. Some patients depend heavily on increasing the volume of the music to drown out the drill and appear to dislike the noise—though many who

dislike the noise will turn it on loud and strong if the operation begins to hurt them. Others use the noise whenever the drill is in action and return to the music only during intervals of inactivity.

Use of Audio Analgesiac in Extractions • The Analgesiac had not been in use very long before a safe opportunity presented itself to perform an extraction with no other palliative than that provided by the Audio Analgesiac. The patient was relaxed and unresponsive throughout the preparation and during the extraction. At the time of the actual extraction, he turned up the volume of the noise as far as it would go. He reported that he could feel that something was going on, but that the noise made the operation quite bearable. Later, this patient reported particular satisfaction with absence of the usual postoperative numbness and soreness.

Since that first extraction, 136 extractions have been made (119 patients) with the aid of the Audio Analgesiac, no other palliative being employed. In every instance, the patient has been aware of the pressure and the pull; in several instances, moderate pain was reported. In no instance, however, was there severe pain, or regret for not having used a conventional anesthetic. On one occasion, four teeth were extracted in a single sitting. Several patients, having experienced one extraction with the Audio Analgesiac, have requested its use at the time of a second extraction. (The authors recommend careful selection of patients for surgery until the operator has gained the necessary experience in the proper operation of the Audio Analgesiac.)

The success of the Analgesiac in minimizing the pain of extractions cannot be attributed, of course, to masking of drill noise. Masking of the sounds made by the dental instruments in the patient's mouth, and of the sound of the extraction itself, may have played a role, but it could hardly be a major one.

DISPLACEMENT OF CONVENTIONAL ANESTHETICS AND ANALGESICS

No effort has been made to press the Audio Analgesiac into use against the preference of a patient for a conventional agent or in an operation in which a conventional agent would offer greater advantages. Nevertheless, in W.J.G.'s practice, use of conventional agents has decreased as follows: Last year, 118 ampules of local anesthetics were used, as compared with 2,000 ampules, which was the average per year for the previous four years. Last year, 25 per cent of a large tank of nitrous oxide was used, as compared with 4.0 large tanks, which was the average per year for the previous four years for analgesia only.

FACTORS INVOLVED IN AUDIO ANALGESIA

Thus far, our main effort has been to make the Audio Analgesiac as effective as possible, and experimental investigation of the phenomenon of the acoustically induced analgesia has been secondary. In the effort to maximize effectiveness, advantage has been taken deliberately of several contributing factors. There is, therefore, probably no explanation that is at the same time simple and complete.

Of the several factors at work, some appear to be most important for some patients, others for other patients.

On the whole, the most important part of the effect is the apparently genuine masking or suppression of pain by sound. The sound must be intense, quite intense unless it has approximately the optimal spectrum and continuity in time. Duncker,[1] having found that severe pain due to heavy pressure on one arm is noticeably reduced when painful stimulation is applied to the other arm, went on to show that the pressure-induced pain decreased also when a loud noise was generated near the subject. We are

reasonably sure that a properly tailored sound spectrum definitely masks dental pain because, in addition to initial observations and the subsequent reports of patients, both of us have had further opportunities during the year to make subjective appraisals, turning the noise on and off for immediate comparison. The pain decreases when the noise intensity is increased.

Also important, in our opinion, is the effect toward which the original observations were oriented. Masking the sound of the drill eliminates a dominant source of "conditioned anxiety." Pain appears to be magnified by anxiety and apprehension, and the masking prevents the magnification. The mechanism of this effect is evidently based on the fact that an important part of the typical experience of pain is what some students of the subject call secondary pain—sensation caused by the reaction to the primary noxious stimulation.[2] This reaction is governed by the levels of apprehension and anxiety.[3,4] Elimination of a source of apprehension and anxiety therefore reduces the over-all painfulness of the experience by reducing the amount of secondary pain.

Both the music and the noise produce a diversion of attention from the dental operation. It is well known that fixing the attention on something else can to some extent reduce the pain caused by an injury. Indeed, in the heat of combat, a soldier may sustain a severe injury without even knowing that he has been wounded. And minor injuries received without pain are commonplace in football. Hardy, Wolff and Goodell[5] describe an experimental demonstration of the influence of distraction.

That the patient is given control over the selection of music or masking sound and over the volume level of the sound he chooses appears to be important. Ordinarily, a dental patient feels that he has almost no control over anything that happens to him in the chair. Being able to control the acoustic stimulation is a source of comfort.

In addition, the controls become means through which the patient communicates with the dentist. When the volume of the music is turned up or the noise switched on, the dentist becomes immediately aware of his patient's mounting discomfort or incipient pain. It seems to be important that this mode of communication is free and unrestricted throughout the operation; verbal communication certainly is not.

With the most fearful and difficult patients, the use of muted stereophonic music as a relaxing agent plays an important role in the over-all procedure. Music has long been used in some dental offices for its relaxing effect. Cherry and Pallin[6] used it deliberately to prepare the way for oxygen-nitrous oxide anesthesia. Prerelaxation is not always an integral part of the present procedure, but in most instances it is a definite help. Many patients like the stereophonic music so much that they become engrossed in the music just as soon as they get themselves settled in the dental chair.

Finally, there appears to be an element of suggestion in the procedure. This is, in our opinion, by no means always a main factor, for the Audio Analgesiac has been found effective in instances in which deliberate effort was made to have the factor of suggestion operate in reverse. Ordinarily, however, the patient is almost surely influenced to some extent by the dentist's confidence in the Analgesiac and his expectation of a certain amount of analgesia. There is no doubt that suggestion is often effective in reducing pain: experiments involving placebos offer abundant evidence,[1,4] as does the experience of the more than 900 dentists who use hypnosis.[7]

CONFIRMING EXPERIENCE

During the last few months, the Audio Analgesiac and the procedure described

here have been demonstrated to a number of leading dentists and arrangements have been made to provide several of them with Audio Analgesiacs for test and experimentation. At the present time five other dentists have gained a sizable body of experience from the use of an Audio Analgesiac, covering test periods ranging from six weeks to five months. Each has reported successful results with over 90 per cent of his patients, with the total number of patients involved amounting to over 1,000.

1791 Massachusetts Avenue

*Psychologist, Bolt Beranek and Newman Inc.

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The role of hypnosis and suggestion in dentistry

Howard W. Marcus, M.D., D.M.D., New York*

Hypnosis can be a valuable asset to the dentist; it can be used to help bridge the gap between the dentist's ability to administer his services and the patient's refusal, for psychological reasons, to accept them. Hypnosis should be used only when other standard procedures do not lead to desired results, or when the desired results can be facilitated by the use of hypnosis. The proper use of hypnosis enables the dentist to perform a more complete health service, and permits a greater number of patients to benefit from dental services.

In the not too distant past, dentists who were known to use hypnosis were called on at times to administer hypnosis for problems not strictly confined to the dental field. The reason for this was that there were not enough, if any, professional men available who could use hypnosis in their respective field of competence. Often, such requests or referrals for treatment were preceded by a remark that everything else had been tried without results.

It must be admitted that the dentist faced with such a request for treatment, especially if it came from a physician or from another dentist, was faced with some soul searching; many times he might have been inclined to submit to the dictates of his heart rather than to the objective considerations of his professional limitations. This era of conflict is reflected in some of the early writings on hypnosis in dentistry.

The era of "conflict of interest" has passed by now. There are today competent professional men in every branch of medicine who are able to administer hypnosis if and where indicated in their respective fields, and because of the broader recognition of hypnosis in the profession, their number is increasing at a steady rate.

Whereas this development relieves the dentist trained to use hypnosis of the burden to choose between his professional competency and other considerations, there remains a need to define clearly where the dentist should and should not use hypnosis within his own field. There are, of course, borderline cases and considerations which cannot be classified, but have to be considered on their individual merits. Experience and judgment will be the only guide here, as in any other professional activity.

Hypnosis in dentistry often is referred to as "dental hypnosis" or "hypnodontics." There is a danger that a too literal and confining interpretation of those terms ignores the fact that hypnosis, even if used in dentistry and for dental purposes only, involves the total personality of the patient. This undeniable fact may startle some and discourage others from the use of hypnosis. Yet all dentists realize that modern dentistry is no longer confined to the mechanical aspects of the profession, that broader medical as well as surgical and psychological considerations form an inseparable and important part of its daily practice.

In addition to these general considerations, ever since Freud, special psychodynamic significance has been attributed to the oral region. Therefore, today's dentist can no longer afford to confine his thoughts to the teeth alone. He is compelled to consider the surrounding tissues, soft and hard, the patient as a whole, body and soul.

It must be admitted that dentistry, in spite of all technological advances regarding equipment and technics, premedication and administration of anesthetics, still appears to represent a threat to the majority of the adult population, and the mere sight of the dental chair still provokes anxiety.

There has been great interest on the part of dentists in finding ways and means to cope with those factors that interfere with the administration of good dental services and which cannot be controlled by the many physical and pharmacological means at the disposal of the dentist. Here is where the use of hypnosis comes in; namely, to help bridge the gap between the dentist's ability to administer his good services and the patient's refusal to accept them, for no other than psychological reasons.

Opportunities for the use of hypnosis exist in every practice, regardless of the specialty involved. This, of course, does not imply that it should be used in a routine fashion. Quite to the contrary, hypnosis should be used only if and when needed; if and when other standard procedures at the disposal of the dentist do not lead to desired results; or if and when the desired results of treatment can be facilitated or improved by the use of hypnosis.

Hypnosis therefore is used in addition to, and not instead of, established dental procedures.

WHEN HYPNOSIS IS USED

Hypnosis is used, in a selective fashion, for the following specific purposes:

1. It is used to reach those patients who do not submit to dental treatment, even the routine dental examination, under any circumstances. These patients generally are not seen by the practicing dentist. They are the patients who finally arouse the ire or the compassion of one of their close relatives, who then makes the appointment for them. They are the patients who usually do not keep such appointments. They are the patients who

are referred to in the profession as "dental cripples." And let there be no misunderstanding by those in the profession whose activities are concentrated on the more mechanistic aspects of dentistry and who never see such patients: those of us who do see them know that they represent a much larger contingent than is realized generally.

2. Hypnosis is used to overcome fear and tension, to counteract previous unpleasant experiences or negative influences with regard to the dental situation; it is used to raise the threshold of pain, and to relax patients who are undergoing treatment.

3. Hypnosis is used for premedication in operative and surgical procedures, either in addition to or instead of chemical premedication, depending on need and circumstances.

4. It is used to allow for a reduction of chemical anesthetic agents such as procaine, nitrous oxide or others and to reduce the unpleasant after-effects of chemical anesthesia.

5. It is used to replace chemical anesthesia where the administration of such anesthesia is contraindicated for medical reasons, such as allergies, heart disease and others.

6. Hypnosis is used to overcome handicaps to the performance of proper dental service and to the normal dentist-patient relationship, such as gagging while roentgenograms are being taken; gagging while impressions are taken; gagging while dentures or other appliances are worn; gagging during the routine examination of the oral cavity for diagnostic purposes; gagging during routine dental treatment or during the routine use of the toothbrush at home.

7. It is used to overcome lack of proper cooperation during such procedures as bite registration, or in the wearing of appliances, such as bite planes or other orthodontic or prosthetic appliances (provided, of course, that this lack of cooperation is not due to faulty construction of the appliance).

8. Hypnosis may be used for the control of flow of saliva and capillary bleeding to some extent, if desirable, although its effectiveness in controlling capillary bleeding has been questioned.

9. Hypnosis can be used to neutralize the commonly encountered objections to the noise and vibration caused by the dental drill.

10. Hypnosis can be used further in the form of posthypnotic suggestion, for the control of postoperative sequelae such as pain and bleeding. Reconditioning patients through posthypnotic suggestions to accept dentistry in the future without prejudice is one of the important and most rewarding applications of hypnosis in dentistry.

11. Finally, hypnosis can be used for the correction of habits which interfere directly or indirectly with dental treatment, and with the health, function or esthetics of the dental apparatus and the soft tissues of the oral cavity. These habits include thumb, finger, cheek or tongue sucking; pencil, nail, lip or tongue biting; bruxism, excessive smoking and many others.

Habits centered in and around the oral cavity ought to be handled with discrimination and judgment and, generally speaking, ought to be treated by a competent psychotherapist. This is not the place to discuss this very important aspect of the dentist's position in dealing with habits centered in and around the oral cavity, in as much detail as the subject warrants. However, a few general statements may be in order. An encouraging remark, a positive statement as to the effect of treatment, the treatment proper, the relief of pain, anxiety and tension—all these and many other aspects of the dentist's daily routine are psychotherapy to some degree.

Of course, it is not the dentist's place

to administer psychotherapy as such any more than it would be his place to open surgically and curet the antrum to recover a broken root tip. On the other hand, if the dentist could pick up the broken root tip while it is accessible from the oral cavity and all he had to do is to reach for it with a college plier, and if by such relatively minor intervention he could protect his patient from major surgical procedure later on, he would not only use good judgment, but stay well within the area of his competence, by doing so. Although not generally recognized, the same criterion applies to the question of the handling of habits in the dental office by the properly trained dentist.

The scope of this discussion means that the problem of habits and symptom removal by the dentist can be touched on in a very general manner only. This is always dangerous and leaves room for misunderstanding and misinterpretation. Therefore, I would like to stress that any habit that is deeply imbedded should be treated by the psychotherapist and should not be handled by the dentist. Some of the habits dealt with in dentistry appear not to be deeply imbedded, and over the years they may have acquired the character of a conditioned reflex. For example, the sucking of the thumb may have had a great psychodynamic significance and meaning to the child when he was an infant. It may have been a replacement outlet for his want of the mother's breast. But if the child has reached the age of 8 or 9 or 10 or 14, the original meaning of this habit often has been lost over the years; it has changed direction and purpose, and by now may have become a conditioned reflex.

If the habit no longer has psychodynamic meaning, if it is not deeply imbedded but is superficially attached, it often will yield to the use of suggestion. If this simple approach is not successful and suggestion does not relieve the habit, this serves as a means of differential diagnosis and the patient ought to be referred for treatment to a competent psychotherapist. The point is that any habit which is deeply imbedded and psychodynamically meaningful to the patient will not yield readily to simple suggestions of any type.

The preponderance of competent opinion expressed in the past has frowned on the use of the direct approach of symptom removal without full evaluation of the total personality factors involved and the underlying psychodynamics of the patient. One of the main objections to the direct approach has been the possibility of release of other, and at times less desirable, outlets for the underlying disturbance.

Of late, however, more and more workers in the field have expressed a dissenting view. They point out that few practical cases have been cited to justify a rigid position. On the other hand, cases have been reported where a direct approach has served not only to remove the symptom for which it was intended, but at the same time, other coexisting undesirable symptoms and personality disorders. Furthermore, some men have pointed out that only after the elimination of a symptom by the direct approach have they been able to reach the underlying personality disorder through psychotherapy. Thus, the elimination of the habit has served to cut through the patient's defense system and to open the avenue for broader therapy.

Again, the dentist ought to have the necessary background to enable him to be selective, and to use good judgment and proper procedure, before dealing with this complex problem. There is no reason why the dentist should not enlarge his horizon to enable him to deal with psychological problems that occur in his field in the same manner as he has learned to deal with medicosurgical problems that occur in today's practice of dentistry.

CONTRAINDICATIONS FOR USE OF HYPNOSIS

So far, this article has dealt mainly with the indications for the use of hypnosis in dental practice. There are also definite contraindications for the use of hypnosis by the dentist:

1. Hypnosis is not to be used if the dentist lacks training in, and familiarity with, the subject matter as a whole. Here the same limitations apply as in any other area of professional activity. It is at times as easy to hypnotize a patient as it is to put a patient to sleep with a bottle of ether—yet in order to use anesthesia or hypnosis in the dental office, the dentist should have acquired a thorough knowledge of, and background in, all aspects which enter into the administration of either.

2. Hypnosis is not to be used if the dentist has emotional problems concerning his attitude toward the patient or toward hypnosis, or both. The dentist using hypnosis ought to have enough insight into his own emotions to enable him to desist from using hypnosis under circumstances which would not allow him to use it in an objective and professional manner. The same limitations apply here in the emotional area as would apply to the dentist who might be physically handicapped to perform certain mechanical functions.

3. Hypnosis is to be discouraged if the patient has emotional problems concerning his attitude toward the dentist or hypnosis, or both. The dentist using hypnosis ought to be able to recognize emotional problems in his patients which call for a "hands off" attitude on his part. Here again the same applies as in any other area of his activities. If the problem goes beyond the scope of the dentist's training and experience, referral to a competent specialist is the required procedure.

4. Any deep-seated or psychodynamically meaningful condition which the dentist may encounter in his area of contact with the patient should not be treated by the dentist. Referral to the psychotherapist is imperative.

5. Any manifestation of dependency on hypnosis ought to be recognized and counteracted promptly.

6. Hypnosis should not be used if the dental services required in the specific case can be equally well performed without the use of hypnosis. Unless there are definite indications for the use of hypnosis, its use is contraindicated, as would be the use of procaine for the preparation of a devitalized tooth.

7. Hypnosis should not be used by the dentist to probe or explore the mind of his patient.

8. Hypnosis should not be used by the dentist on mentally aberrated persons, except with the consent and cooperation of a psychiatrist, and then all other conditions should be as given for any other patient.

9. Hypnosis should not be used by the dentist for any manipulation which is outside his sphere of interest and competency.

PROCEDURE IN DENTAL OFFICE

A thorough history-taking should precede any clinical contact. Special interest should be paid to the patient's previous experiences with dentistry and dentists, and the patient's attitude toward both: previous experiences with hypnosis and the reasons for the present use of hypnosis should be explored. Questions as to past or present psychotherapy should be asked and, where possible, consultation with the therapist should precede any clinical procedure.

The existence of functional diseases, allergies, and so forth, should be covered in the interview, in addition to all other aspects of interest within the frame of a general case history.

After the history-taking, time should be spent on eliciting and correcting mis-

conceptions and to establish rapport with the patient. This helps to assure the patient's cooperation and allows the dentist to become acquainted with the psychological make-up of his patient.

Once all misconceptions are dispelled and the patient has expressed his willingness to enter the hypnotic state, he may be tested as to his susceptibility and cooperation. These tests serve to show the patient how suggestion works, and they allow the dentist to get more insight into his patient's degree of suggestibility—his general attitude and reaction. They allow the dentist to adapt his future procedures accordingly.

The next step is the induction proper. The method of induction should vary according to patient and circumstances. Many times a combination of several technics will be used in practice. The method chosen preferably should be nonauthoritarian, permissive in nature.

The dentist is naturally most interested in having the patient sufficiently relaxed in the chair to enable work to be done without interference. At the same time, he likes to see the patient in a cooperative mood and free of unfavorable physical and mental reactions. All this usually can be achieved without using the deeper stages of hypnosis. As a rule, therefore, induction is carried no further than is necessary to accomplish the main goal, which is good dentistry and not deep hypnosis. The properly managed patient generally enjoys the calming, relaxing effect of hypnosis and looks forward to its future application. However, once the existing obstacle to the administration of good dental services has been removed by the use of hypnosis, it often becomes unnecessary to employ hypnosis in future sessions. Patients are prepared for this during the initial interview, while in the hypnotic state, through posthypnotic suggestion and by casual suggestions given during the waking stage.

The more familiar the dentist is with the technics and principles underlying the use of hypnosis, the less he actually needs to employ rigid hypnotic procedures. He often will get almost equal results with the constant and purposeful use of controlled suggestion, which then assumes the character of waking hypnosis.

SUMMARY

Hypnosis can be a valuable asset to the modern and properly trained dentist. It should never be used without definite indication for its use. It is an adjunct to, and not a replacement for, other valuable dental procedures. It is not a panacea. Once the obstacle to the use of standard dental procedures is overcome, there is no further need for the use of hypnosis in treatment of the particular patient. The more familiar the dentist is with the technics and principles underlying the use of hypnosis, the less need there appears to be for rigid hypnotic procedures. Hypnosis should never be allowed to become a crutch on which dentist or patient depends. If such dependency exists, it should be recognized and counteracted.

The evaluation and proper use of psychodynamic factors involved in the dentist-patient relationship, including the use of hypnosis and suggestion in dentistry, will enable the dentist to perform a more complete health service. It will enable a greater number of patients to benefit from modern dental services. It will lift the dentist's horizon and elevate dentistry from the mechanistic plateau of the past to a position of a truly respected and competent member of the healing arts.

200 Central Park South

*Member of faculty, Institute for Research in Hypnosis.

Genetic effects of roentgen rays

Berwind P. Kaufmann, Ph.D., Cold Spring Harbor, Long Island, N. Y.*

To paraphrase Shakespeare: "The evil that radiations do lives long after the strontium^{90} is interred with man's bones." This evil is perpetuated beyond the life span of the exposed individual by the utilization in conception of eggs or sperms that have suffered genetic damage. The tangible defects of living beings indicate the widespread distribution of genetic damage. Although the roentgen rays used in diagnostic procedures in the dental office contribute a very small share to the over-all genetic damage experienced by the human species, efforts should be made to reduce unnecessary exposure of the gonads without sacrificing the essential uses of radiation in diagnosis. Members of professional groups familiar with the use of radiations have a responsibility to inform the public of the hazards as well as the advantages of new sources of radioactivity.

In the controversy now raging throughout the world about the effects of fallout, the opinion of the geneticist may be epitomized with a paraphrase of Shakespeare: "The evil that radiations do lives long after the strontium^{90} is interred with man's bones." This "evil" is engendered by the impact of ionizing radiations on cells of the reproductive glands, and it is perpetuated beyond the life span of the exposed individual by the utilization in conception of eggs or sperms that have suffered genetic damage.

Genetically, it makes little difference whether the original damage is done by beta rays from strontium^{90}, by gamma rays from cesium^{137} or some other radioactive isotope, by roentgen rays, electrons, or nuclear particles from some man-designed generator or accelerator. What is more important is the total or cumulative dose of penetrating ionizing radiation that reaches the eggs or sperms, or the cells of the gonads from which they are derived. To the best of our knowledge, any man-made radiation is genetically undesirable, whether delivered continuously or intermittently. It is all potentially capable of damaging the materials of heredity. Radiation constitutes an ever-increasing hazard to the health, happiness, and welfare of future generations as man continues to add to the natural or background quantity. There is no escape from naturally occurring radiation, to which man has been exposed since he emerged as a species. Mutations attributable to the background radiation have occasionally—very occasionally—been advantageous. Some have facilitated man's ascent in the course of evolution. Before the dawn of life, gamma radiation probably favored production of the "organic milieu" requisite to the origin of living matter.[1] Far more

frequently, however, the impact of radiations on living organisms through the ages has exacted its toll in the form of damaging or deleterious mutations.[2]

Available evidence indicates that the mutations now being induced by man-contrived radiations are just as destructive as those that have arisen spontaneously in the past; they may be even more destructive. The evidence has been obtained from studies of mutation production in experimental animals and plants, and from pedigree and statistical analyses of inherited human characteristics. When the implications of these studies are considered, the geneticist has no hesitation in sounding a note of warning against the use of any radiation without careful evaluation of the dangers involved. Assessing the impact of radiation on the materials of heredity is like viewing an iceberg from afar—there is a lot more to it than meets the eye, and it is the part not immediately detected that may eventually cause the greatest damage.

In the face of these considerations, control of the quota that man adds to the natural background becomes a matter of world-wide concern. Control of a small share of this added radiation is in the hands of dentists. Geneticists urge that control be exerted to reduce unnecessary exposure of the gonads without sacrificing the essential uses of roentgen rays in diagnostic or therapeutic procedures.

NATURE OF ROENTGEN RAY DAMAGE

Roentgen rays are electromagnetic radiations. In the spectrum, the long radio waves are at one end. Then come the infrared, the visible light, the ultraviolet, the roentgen rays, the gamma rays, and the extremely short cosmic rays (**Fig. 1**). They all carry energy from one place to another. Rays of long wave lengths have relatively low energies and tend to flow around objects in their paths. But rays of short wave lengths, having much greater energy, penetrate the objects. If, in their passage into or through materials, they eject electrons from constituent atoms to form ions, they are designated as ionizing radiations.[3]

The roentgen rays fall into that part of the spectrum where the wave lengths are short and of high frequency. When roentgen rays are produced by electron bombardment of a target, as in x-ray machines, they exhibit a continuous range of longer and shorter wave lengths. The longest wave lengths, or very soft roentgen rays, have comparatively slight penetrating power but may induce erythema, epilation, or desquamation in humans. Soft roentgen rays are readily absorbed by filters of aluminum, which are now being used extensively for reducing the unwanted radiations from x-ray equipment.

Human radiation damage from roentgen rays is generally attributable to the action of wave lengths ranging from a few angstroms to a few thousandths of an A. (roughly a fifty-millionth of an inch or shorter). This corresponds to an energy range from a few thousand to a few million electron volts

$$(1 \text{ e.v.} = 1.6 \times 10^{-12} \text{ ergs}).$$

Because of their great energy, these rays have considerable penetrating power. Their ability to traverse the softer tissues of the face more readily than the dense absorbing materials in bone, dentin and enamel accounts for their use in diagnostic technics.

Impact of Radiations on Living Cells • Radiations carry a flow of energy into living materials and distribute it in a manner that produces a large number of activations. The activating energy of roentgen rays is effective in dislodging external electrons from the component atoms. The pathways and chain reactions by which energy is dissipated in matter are complex, but it is worth noting here that the energy is degraded into smaller and smaller packets down to the so-called chemical range. The low-energy second-

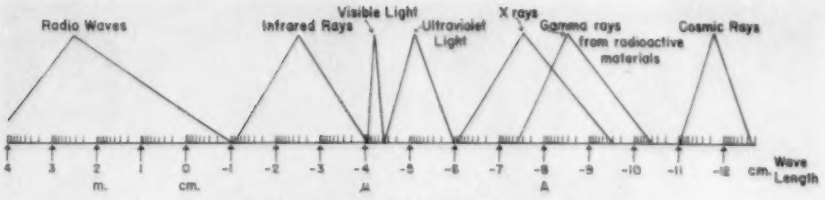

Fig. 1 • Electromagnetic spectrum. Different types of radiation are specified in terms of wave lengths, plotted on a common logarithmic scale. Thus, the number 2 under the third arrow from the left means 1×10^2 cm. = 100 cm. = 1 meter (m); the zero (fifth arrow from left) indicates 1×10^0 cm., which represents a wave length of 1 cm.; the numeral -4 in the center of the diagram represents 1×10^{-4} cm. = 0.0001 cm. = 1 micron (μ); and so forth. (Adapted from a diagram by F. S. Brackett, in Biological effects of radiation, vol. I. B. M. Duggar, ed. New York, McGraw-Hill Book Co., 1936. p. 125)

ary electrons produced in this sequence of events tend to dissipate their energy within short distances from the points of origin—perhaps 10 A. or so in living cells. As a consequence, localized changes are brought about in the chemical state of aggregation of the irradiated materials.

Alterations of Chromosomes and Genes by Roentgen Rays • Inheritance depends on the transmission and expression of self-reproducible units, or genes, that are located in chromosomes (Fig. 2). Radiations may interfere with hereditary processes by altering either the chromosomes or their constituent genes.

Gross chromosomal aberrations are readily identifiable with the microscope (Fig. 3). The finer chromosomal aberrations overlap and intergrade with the gene mutations, since both involve subtle modifications in the physical and chemical properties of chromosomal materials. Chromosomal breaks and gene mutations are produced in direct proportion to the roentgen ray dose. No threshold effect has been detected in experimental studies.

Chromosome breakage that leads to death of the germ cells, or the cells from which they are derived, can have no genetic effect because death terminates the cell lineage. Mature sperms or eggs containing broken chromosomes may function in fertilization, but the zygotes will usually fail to produce viable embryos unless the damage is repaired. Even so, a restituted chromosome may carry a "scar region" having altered genetic properties. If two or more breaks are produced in the chromosomes of a gamete, the broken ends may reassociate to form new combinations of parts. A zygote containing this rearrangement may develop into an apparently normal individual, but when it in turn produces gametes, about half of them will be genetically unbalanced because they will carry some chromosomal regions in duplicate whereas others will be absent. Such gametes may participate in the formation of a zygote, but it will usually fail to develop into a normal embryo because it contains an unbalanced diploid gene complex.

How sensitive are chromosomes to breakage by radiations? A dose of 7.5 r to a grasshopper embryo produced breaks in about 0.5 per cent of the chromosomes in neuroblast cells.[4] This 7.5 r is only about twice the skin dose delivered per film in a dental roentgen-ray examination using a machine with a short cone and 1 to 2 mm. of aluminum as a filter.[5] As little as 2 r has produced a measurable effect on the chromosomes of some plant cells. A few dozen densely ionizing protons (elementary particles that are

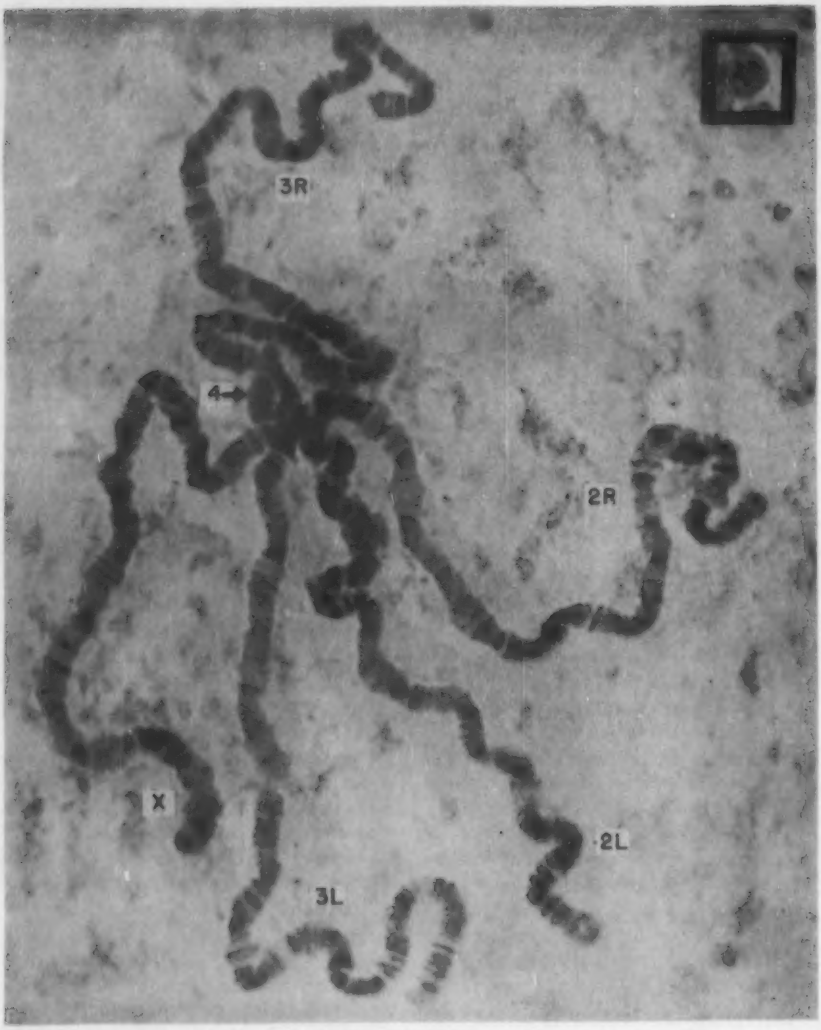

Fig. 2 • Chromosomes of the vinegar fly, Drosophila melanogaster, showing alternating banded and interband regions throughout their lengths. Several of the known genes of this species have been localized in these chromosomes with respect to identifiable banded regions (chiefly by cytological identification of the extent of small segments that had been removed as a result of x-ray treatment). The photograph was made from a squash preparation of a salivary gland cell of a larva; it shows the X chromosome (X), the right and left limbs of the second and third chromosomes (2R, 2L, 3R, 3L), and the small fourth chromosome (4). Each of the limbs shown is formed by the close association of two homologous chromosomes, one maternal and one paternal in origin. Salivary gland chromosomes are giant chromosomes; the size of the mitotic-type chromosomes in a neuroblast cell is shown in the inset, photographed to the same scale as the salivary-gland type

Fig. 3 • Gross chromosomal alterations induced by roentgen rays in plant cells. A, the normal complement of six v-shaped, longitudinally split chromosomes, each with a median spindle-fiber attachment region (represented by a narrow gap) at metaphase of the pollen grain mitosis. B, a broken chromosome (third from top) and a fragment (to left). C, an exchange between two chromosomes: the lowermost chromosome has one abnormally long arm and the chromosome lying above it has one unusually short arm. D, an exchange leading to the formation of a chromosome with two spindle attachment regions, and a fragment without such regions. B is produced by a single roentgen ray-induced break; C and D require two independent breaks. (Redrawn from photographs published by Karl Sax in Genetics 25, p. 55, 1940)

identical with hydrogen nuclei) focused on prophase nuclei in cultures of heart tissue from adult newts, have caused breakage of chromosomes, made them sticky, and affected their capacity for oriented mitotic movement.[6] In contrast to the effect of direct exposure of the chromosomes, little or no demonstrable deformation was produced when thousands of protons were focused on nonnuclear portions of the cell such as spindle or cytoplasm.

The preceding quantitative effects were detected in studies of somatic or body cells, rather than those of the germ line, but they serve to demonstrate the sensitivity of the gene-transmitting structures to the action of ionizing radiations. It seems probable that gross chromosomal changes may be responsible for most of the damage that heavy doses of roentgen rays inflict on the exposed body.[7] Small doses, of the magnitude to which man is customarily exposed, may inhibit mitotic processes or damage the chromosomes, but in many instances reparative processes eliminate any diagnosible evidence of the incipient injury. Restorative mechanisms thus seem to guarantee some "protection" to humans, who live in an environment where the background radiation affords an appreciable number of ionizing events per cubic centimeter of body tissues every hour of life. Body cells that have been irreparably damaged may be replaced in a growing population by undamaged associated cells. Loss of a few cells in this manner need not be a major tragedy, since as many as 500 billion new cells may be made daily by the average human adult to replace those that have been discarded (a large number, but a small fraction of the total of about 60,000 billion composing the human body).[8]

If a cell that has been damaged by irradiation is not eliminated from a population but acquires instead a capacity for unbridled multiplication, a new kind of hazard may arise: the potentiality for initiation of malignant growth. But radiations can also retard or inhibit cell division under suitable conditions of treatment. Here, indeed, is a modern symbol of the Roman deity Janus, with two faces looking in opposite directions, one malevolent and one beneficent.

Among cells of the germ line, spermatogonia, which are the progenitors of the male gametes, go through a series of somatic-type divisions before they begin the maturation cycle. If these ancestral cells are so damaged by irradiation that they cannot enter the meiotic or reduction divisions, a period of sterility ensues. This comes after the mature sperms and their immediate predecessors, the spermatids and spermatocytes, which were present before irradiation, have been exhausted. A dose of radiation as small as

5 r produces an experimentally detectable effect, for example, on the mitotic activity and conversion into spermatocytes of the extremely sensitive spermatogonial cells of mice.[9]

As already noted, radiation damage may prevent a gamete nucleus derived from one parent from functioning competently in combination with the partner derived from the other parent in the production of a normal embryo. In the organisms considered, two sets of chromosomes are required to effect normal development. There are some species, however, in which one set suffices to control growth and differentiation. If frog sperms are treated with heavy doses of roentgen rays so that they cannot participate in zygote formation after penetrating the eggs, the chromosomes of the egg nucleus alone may assume control of development.[10] Alternatively, if the nucleus of a wasp egg is inactivated by irradiation, the fertilizing sperm in itself may initiate the processes that lead to the formation of an adult insect.[11] The individuals obtained as a result of these two types of treatments are, respectively, "fatherless" and "motherless" with regard to their genetic constitution.

Mutations • The production of gene mutations by ionizing radiations in the chromosomes of gametes, or their progenitor cells, constitutes a genetic hazard of far greater proportions than the induction of gross chromosomal aberrations. Before a consideration of the magnitude of this hazard, the different kinds of genes that serve to modify developmental or functional properties of an individual should be discussed. If it is assumed that the two genes at a given locus in two homologous chromosomes (one derived from each parent in the formation of the zygote) are different, one of the two usually dominates the other in its ability to control the metabolic processes for which that gene serves as a differential. This is the dominant gene; its partner is the recessive. The contrast, however, is not usually between mutually exclusive states, since the less powerful, or recessive, gene often manages to express itself to some extent.

A newly mutated gene may be either dominant or recessive with respect to its wild-type partner, or allele. Radiation-induced mutants are chiefly of the recessive type. Most of them have no visible effects,[12] but because of their ability to exert some degree of influence on metabolic processes (perhaps affecting viability, vigor or fertility), they may modify physical and mental responses of the recipient individual even when carried in the heterozygous state (that is, in the presence of the wild-type allele).

Dominant and recessive genes that are located in the autosomes (the 22—or, possibly, 23—pairs that are similar in human males and females) do not show any association with sex. Genes that are located in the sex chromosomes (a pair of X's in the human female; an X and a Y in the male) are said to be sex-linked.

Gene-determined Anomalies in Man • The tangible defects of living beings serve to indicate the widespread distribution of genetic damage. Such damage appears in the form of mental deficiencies, epilepsy, congenital malformations, neuromuscular aberrancies, hematological and endocrine defects, impairments of vision and hearing, cutaneous and skeletal aberrations, or defects in the gastrointestinal or genitourinary tracts. In the United States, in 3 to 5 per cent of live births there are defects of this sort, half of which have simple genetic origin and appear prior to sexual maturity.[12]

With respect to the teeth, some abnormalities are of heritable nature.[13] In some human family lines either incisors or molars may be absent (anodontia), or the roots of some teeth may be missing.[14,15] A well-known illustration is af-

Table 1 • Probable average 30 year radiation dose from various sources of radiation to the gonads of persons living in the United States*

Source	30 year gonad dose in rads†	Percentage of total average dose
Natural background		
Cosmic rays	0.8	
Earth & housing	1.6	
Atmospheric	0.1	
Internal	0.6	
	3.1	39.6
Medical examinations	4.6	
Fallout	0.1	
Luminous dials	<0.1	
	4.8	60.4
	7.9	

*Based on Laughlin, J. S., and Pullman, I. The genetically significant radiation dose received by the population of the United States. III. Gonadal dose produced by the medical use of x-rays. (Preliminary edition). Washington, D. C., National Academy of Science, National Research Council, 1957.

†The rad is the unit of absorbed dose and is 100 ergs per gram. For purpose of comparison with Table 2, the rad and the roentgen may be regarded as essentially equivalent, although conversion factors between rads and roentgens have been determined for a variety of materials and energies of roentgen rays. As an example, at 1,000,000 electron volts (1 m.e.v.), 1 roentgen = 0.97 rads with respect to soft tissues of mouse.

forded by the "toothless men of Sind," inhabitants of a community in India. The incidence of dental caries appears, in some instances, to be dependent on hereditary differences.[16] Brown coloration of teeth is transmitted in some families as an autosomal dominant. In other families, this condition seems to be attributable to a dominant, sex-linked gene carried in the X chromosome.[17] An affected man will transmit the defect to all his daughters, who receive a paternal as well as a maternal X chromosome; but his sons will not be affected, since they receive a Y chromosome from their father. A woman with this characteristic, mating with a normal man, will transmit the gene for defective enamel to half of her daughters and half of her sons.

Most studies of inheritance of human characters have been based upon pedigree analysis, in which individuals in successive generations are compared. There is rarely any precise knowledge of the source of origin of the mutant type of gene. Some mutations undoubtedly result from damage from radioactive materials in the environment. The atoms composing these materials are inherently unstable, but have a tendency to readjust into a more stable configuration with the release of a burst of radiant energy. There are radioactive materials in soil and rocks. Some of these substances are also built into dwellings, into masonry. Each man has some radioactive materials in his body (especially potassium[40]) slowly disintegrating and emitting its radiations into his body and his neighbor's. There are also cosmic rays coming from outer space which are so highly penetrating that they can pass through 10 cm. of lead (Fig. 4). The contributions from these sources, insofar as they affect the germ cells of man during the period of reproductive activity (the gonadal dose) are summarized in Table 1. In special areas, such as the coast of Travencore in India, where a fishing population resides on monazite sands rich in thorium, the gonadal dose from this source of background radiation has been reported to reach 1 r or more per year.

The proportion of naturally occurring mutations in humans that can be attributed to radiation damage is a subject of debate and study.[18] One estimate places the fraction between 2 and 20 per cent of the total.[19] Other factors that contribute to man's load of spontaneous mutations may have their origin in his external or internal environment. Certain chemicals have been found to have mutagenic properties when tested on experimental organisms, and localized thermal changes are also capable of affecting the materials of heredity. Sometimes the delicate system by which chromosomes and genes are duplicated goes awry for some unknown reason, so that false copies of one or more genes are produced. But for the purposes of this

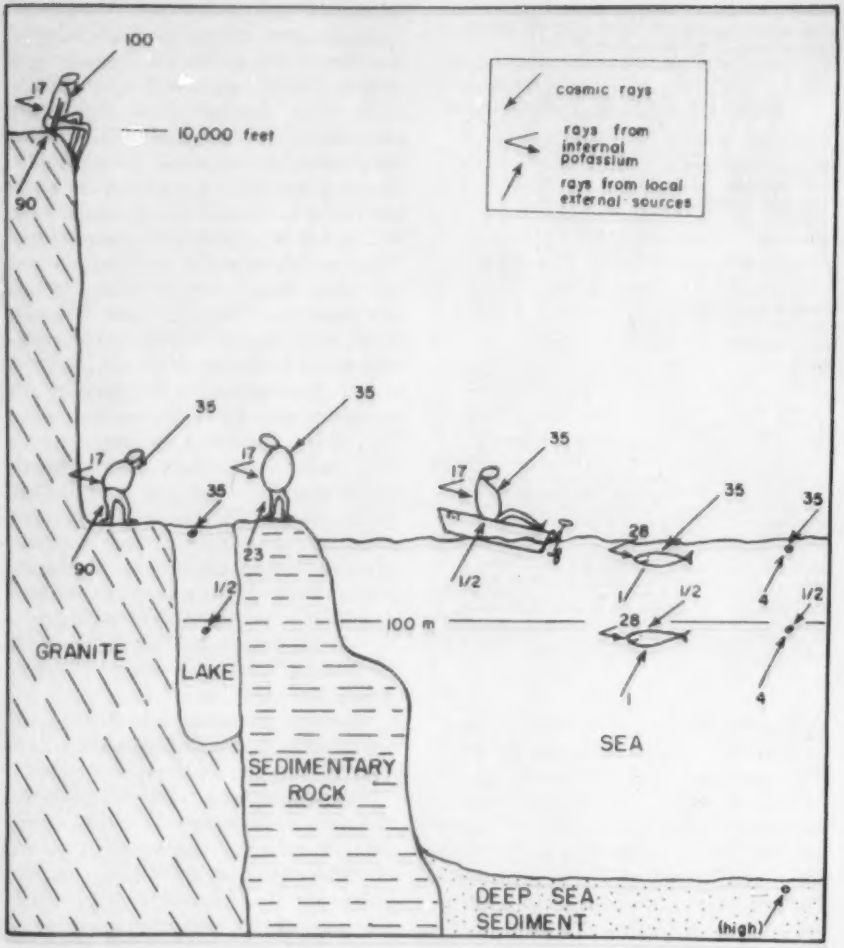

Fig. 4 • Comparison of natural radiations received in various domains by selected organisms. Doses represented in millirads per year. Interpretation: man over granite at 10,000 feet, 207 millirads; man over granite at sea level, 142 millirads; man over sedimentary rock, 75 millirads; man over sea, 52 millirads; large fish at surface in sea, 64 millirads; large fish at 100 meters depth, 30 millirads; microorganism at surface of sea, 39 millirads; microorganism at 100 meters depth in sea, 4+ millirads, and so forth. (Copy of original drawing from article, Comparison of some natural radiations received by selected organisms, by Theodore R. Folsom and John H. Harley, to be published by the National Academy of Sciences. Reproduced with permission of the senior author)

discussion, the important consideration is that the types of mutations occurring in nature can also be induced by the action of roentgen rays, and that transmission of the mutant genes by the gametes can initiate structural or behavioral anomalies which can be perpetuated through successive generations.

Frequency of Induced Mutations • It thus becomes essential to determine what contribution a given dose of roentgen rays, or other ionizing radiation, will make to man's genetic load. In more precise terms, we might ask how many roentgens impinging on the gonads would be required to double the background frequency of deleterious mutations.

The answer hinges on a knowledge of mutation frequency per unit of radiation. The most precise data have been obtained in studies of flies, mice, maize, and some microorganisms. They have relatively short life cycles (as compared with man), and have afforded numerous progeny for quantitative analysis in many successive generations. These studies have shown that differences in sensitivity to ionizing radiations exist in different organisms, in different cells within an individual, and even in different stages of the mitotic cycle. Available data suggest, for example, that genes of mice are about 15 times more mutable per roentgen of roentgen rays than are comparable genes in similar types of cells in the vinegar fly, Drosophila. These data must be regarded as provisional, but they represent the best estimates that are now available, and have been used extensively in calculating the "doubling dose" for the human species. The criticism may legitimately be raised, of course, about the validity of extrapolating from mice to men. It is obvious that more extensive data on other mammals, including man, are sorely needed.

As a result of these uncertainties, various estimates of the doubling dose have ranged from as little as 3 r to as much as 150 r. The 3 r value (which is based on the supposition that all spontaneous human mutations are caused by radiation) seems too low when judged in terms of the conclusions derived from the Hiroshima and Nagasaki exposures.[20] The best estimates, taking all factors into consideration, fall within a 30 r to 80 r range.[2, 19]

Prospect of an Increased Genetic Load • It has often been assumed that if man were subjected generation after generation to doses of man-made radiations capable of doubling the store of deleterious mutations in individual members of the human species, the present level of tangible genetic defects in the population would eventually be doubled. The Committee on Genetic Effects of Atomic Radiation of the National Academy of Sciences estimated that about two million children among the next 100 million born in the United States will suffer from some structural or functional defect because of genes transmitted by their parents. If the present gonadal dose of radiation were doubled, the number of defectives could conceivably rise during succeeding generations to an eventual new total of four million.[2]

The parallel report of the Committee of the British Medical Research Council[19] considered the possible effect of a doubling dose in some specific cases of human inheritance. The frequency of a dominant gene, such as that responsible for achondroplasia (a type of dwarfism), which now has a frequency of 1 in 9,400, would be approximately doubled within three or four generations if the mutation rate were permanently doubled. Doubling the mutation rate of a sex-linked trait, such as that responsible for hemophilia, with an incidence of about 1 in 12,000, would bring about an increase of close to 90 per cent in six generations. A simple recessive trait, such as phenylketonuria (a metabolic disturbance that is associated with a severe mental defect, so that few afflicted individuals have progeny), which now has a frequency of about 1 in 40,000, would increase only about 50 per cent in 50 generations if the mutation rate were permanently doubled.

At best these examples offer only fragmentary information about the possible effects of chronic doses of increased radiation on the human population. We

Table 2 • Genetically effective average gonad doses from medical diagnostic roentgen ray examinations and radiation therapy treatments received per person during one generation (30 years) by the population of the United States*

Source	Minimum gonad dose (roentgens)	Probable gonad dose (roentgens)
Diagnostic examinations		
Roentgenography	1.0	1.8
Fluoroscopy	0.3	1.5
Photofluorograms & mass chest roentgenograms	0.006	0.006
Dental roentgenograms	0.03	0.1
Obstetrical roentgenograms	0.16	0.7
Total diagnostic dose	1.5	4.1
Roentgen ray and radioisotope therapy treatments	0.5	0.5
Total gonad dose	2.0	4.6

*Based on Laughlin and Pullman.

have no substantial basis for assuming that a new crop of radiation-induced mutations, quantitatively equivalent to those now existing, would merely add a qualitatively similar increment to the existing genetic load. The experimental evidence now available, on the contrary, suggests that this assumption is not tenable.[21] The genetic load carried by a sexually reproducing population represents a balance determined by natural selection between the adaptive requirements of the species and the pressure exerted in the production of new mutations. Some share of the selection now resides in the hands of man himself. The rapid development of therapeutic methods for use by the medical profession, for example, tends to maintain to the age of procreation persons who would not otherwise remain alive, or virile enough, to transmit their genes to succeeding generations. On the other hand, very little is known about intra-uterine selection or other forces that would tend to restrict the perpetuation and dissemination of mutations that are now being induced by man-made sources of radiation. Inability to establish a simple correlation between the genetic load of the individual and that of the population does not invalidate the assumption, however, that all radiation-induced mutations represent potential genetic hazards. On the contrary, many considerations suggest that newly induced mutants are likely to be more deleterious than those that have been screened by natural selection and maintained in the population for many generations.

ROENTGEN RAYS IN THE DENTAL OFFICE

Of the total of about 4 r representing the average 30-year gonad dose attributable to diagnostic medical examinations, only about 0.1 r is referable to dental roentgenograms (Table 2). The skin dose, of course, is vastly greater. It has been reported that a full mouth examination involving 14 to 30 exposures can give a dose of 100 to 300 r to parts of the face. Patients who receive such doses show significant hematological changes.[22] With the use of adequate filtration, as well as ultrafast film, the values can be reduced appreciably.[23]

About 94 per cent of the more than 80,000 active dentists in the United States in 1953 owned x-ray equipment.[24] A rough estimate indicates that about 207 million roentgenograms were taken with that equipment in the course of the year.[5] During an examination, a patient usually receives a small gonadal dose. The operator also probably receives some radiation as a result of scattering. Obviously, the amount varies with the individual machine, the effectiveness of shielding, the position of the operator and the number of roentgenograms prepared. Calculations by Laughlin and Pullman,[5] based on an assumed annual total of 189 million roentgenograms, suggest that 83.5 million were made of patients under 30 years of age. The probable genetically effective roentgen ray dose delivered an-

nually to this fraction of the population of the United States in the course of dental examinations thus approaches 400,000 r (Table 3). When this figure is viewed with respect to the premise adopted by many geneticists that the harm to a population is roughly proportional to the total radiation dose, irrespective of its distribution among the members of that population,[25,26] the genetic damage effected by diagnostic procedures in the dental offices cannot be regarded as negligible.

Table 3 • Estimate of probable annual roentgen dose from dental roentgenograms to gonads of patients under 30 in the United States*

Number of examinations	Gonad dose per examination (milliroentgens)	Total roentgens per year
10 to 30 year old patients		
♀ ♀ 44,600,000	2	89,000
♂ ♂ 27,900,000	8	223,000
Patients under 10		
♀ ♀ 5,600,000	4	22,000
♂ ♂ 5,400,000	12	65,000
		♀ ♀ 111,000
		♂ ♂ 288,000
	Both sexes	399,000

*Based on Laughlin and Pullman.

PROTECTION AND PALLIATION

It was noted earlier that differences exist in the responses of different cells to ionizing radiations. The response of a given cell type can be influenced experimentally by treatment before or after roentgen ray exposure.

Some years ago it was discovered in the laboratory of the department of genetics, Carnegie Institution of Washington, that infrared radiation would sensitize chromosomes of the vinegar fly, Drosophila, so as to increase noticeably the frequency of chromosomal aberrations induced by a given dose of roentgen rays; a few years later it was discovered in the same laboratory that vapors of ethyl alcohol, penetrating the culture medium in which colon bacilli or enzyme molecules were suspended, would "protect" them to a considerable degree from the damaging effects of a given dose of roentgen rays.[27]

A large share of the more recent work is concerned with protection against radiation death in microorganisms and mammals. If oxygen tension is decreased to below normal, the sensitivity of the organisms is often decreased proportionally. Among chemical agents that have been used, sodium hydrosulfite has protected microorganisms against radiation. However, it is toxic to mammals. Cysteine, on the other hand, afforded sufficient protection to mice to permit almost a doubling of the dose of radiation required to kill half of the exposed individuals (the LD_{50}). One of the most promising of the agents now being tested on mammals is known as AET (S, β-aminoethylisothiuronium.Br.HBr). It is effective when administered intraperitoneally, intramuscularly or orally, but is somewhat toxic.

Some progress has also been made in efforts to facilitate the recovery of irradiated organisms. Among the postirradiation procedures that have proved successful in mice are the transplantation and injection of bone marrow from nonirradiated animals. By combining several treatments (AET before irradiation, bone marrow immediately thereafter, and daily injections of streptomycin for 10 days) it has been possible to triple the LD_{50} for irradiated mice.[28] In a study at the cellular level, using grasshopper neuroblasts, the mitotic inhibition normally caused by a 3 r dose was eliminated if the cells were placed immediately after exposure in hypertonic culture medium.[29]

With respect to genetic effects, many agents are now known that can modify the frequency of radiation-induced chromosomal aberrations and gene mutations. Control of temperature, oxygen tension,

or the ionic environment of the cell has proved effective. These studies are important in reaching an understanding of the mode of action of radiations in impairing normal activities of the living cell. It is too early to tell whether they will lead to development of palliative as well as protective measures for man. At the moment the best prospect for reducing the genetic hazards of roentgen rays and gamma rays is to avoid man-made radiations as much as possible.

RESPONSIBILITIES TO MANKIND

With background radiation all around, and scientists so uncertain about the magnitude of the effective doubling dose, people sometimes ask, "Why worry about adding a little more?" The answer is another question, "When does a little become too much?" Somehow, nature has managed to adapt to the level of radiation to which the human species has been exposed since the time of its origin. But this does not mean that a little radiation is harmless; it means only that man has managed to survive with the tragedies occasioned by natural radiation. Contemplating additions to the burden that nature already imposes, it would seem wise to err on the side of safety.

The question today is, "How much is too much?" It is a question of opposed risks. A large part of the controversy that has clouded the political horizon in recent years arises from efforts of men with different backgrounds of training, experience and interests to find a wise and judicious answer to this question. And it makes a difference whether one thinks in percentages or absolute numbers. Thus, a 0.2 to 2 per cent increase over the present spontaneous mutation rate, which would be expected if fallout continued at its present level,[30] appears small until it is translated into the large number of people who unwittingly would be exposed to this radioactive material.

Viewed in a narrow sense, the genetic hazards of ionizing radiations need not be a primary concern of members of the dental profession. The roentgen rays used for diagnostic purposes by dentists throughout the country contribute but a small fraction to the total gonadal dose to which the average person is exposed during the course of his reproductive lifetime. Viewed in the broader perspective of the genetic undesirability of any radiation, it seems important that every practitioner attempt to assay the output of his x-ray equipment in terms of his own welfare and that of his staff and patients.

Broader but less clearly definable is the issue of moral responsibility to mankind. Members of professional groups familiar with the use of radiations are qualified to inform the public of the hazards as well as the advantages of new sources of radioactivity. The need for accepting this kind of responsibility is emphasized by the public's growing tendency to ignore or minimize the dangers involved in exploitation of the energy of the atom. The public is tranquilized by the use of such euphoric terms as "peaceful and beneficent," "harmless," "permissible" and "negligible"; there is created a state of what I shall call "psychosemanticism." Such temporary complacency should never obliterate awareness of possible long-range dangers to the human race.

No one should minimize the important role that radiations play and will continue to play in advancing man's personal welfare and improving his domesticated animals and cultivated plants. But, it must be realized that the maximum permissible doses set in various local and state codes, and the national and international recommendations along these lines, were originally formulated to protect the relatively few persons working with radiation sources. The limits were set on the assumption that only a small percentage of the population would be exposed. As the years pass, the percentage of exposed population increases and new

risks continue to appear from fallout, nuclear reactors, increased use of radioisotopes and so forth. A 100 megawatt (heat) reactor, for example, will in one year of operation produce the same quantity of long-lived fission products as the detonation of a 1 megaton fission bomb. Sometime, somewhere, disposal of the fission products must be made. Will enough be known to solve that problem wisely when the time comes? There is also the possibility, remote to be sure, of a runaway reactor, that could produce millions of curies of activity per day, necessitating abandonment of vast surrounding areas for years to come (1 curie = 37 billion ionizations per second). But this prospect, as that of atomic warfare, lies in the realm of possibilities that, it is hoped, the human species will never experience.

SUMMARY AND CONCLUSIONS

Ionizing radiations may impair mitotic processes, cause breakage of chromosomes and effect mutation of genes. Physical and chemical alterations in the complex pattern of organization of the materials of heredity are involved in the degradational processes; they are attributable to the energy furnished by the radiation.

When mutations are induced in gametes that are destined to be used in conception—or in the progenitor cells from which they are derived—the mutant genes may be transferred to individuals of the next generation and by them to their children, and so on. Mutations are usually harmful, and may be expected to exact their toll sooner or later by affecting viability, vigor, or fertility of the individuals carrying them.

Some radiation damage of genetic significance is attributable to the natural or background radiation. Some additional damage results from man-made radiation. The best available evidence indicates that there is no genetically safe dose of either type; any radiation impinging on the gonads involves some genetic risk.

The roentgen rays used in diagnostic procedures in the dental office contribute a very small share to the over-all genetic damage experienced by the human species. Geneticists urge accordingly that control be exerted to reduce unnecessary exposure of the gonads without sacrificing the essential uses of radiation in diagnosis.

Finally, it may be noted that the scientific, political and social developments of the past decade have created an urgent demand for solution of the problems of radiation genetics that now exist and will become more acute in the future. It is now an Atomic Age, and man cannot afford to know too little or be too late in reaching an understanding of the action of ionizing radiations in effecting mutagenic derangements in the reproductive cells and in modifying thereby the genetic constitution of future generations of mankind.

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*Senior staff member, department of genetics, Carnegie Institution of Washington.

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The Scientist as a Social Asset • General acceptance of the scientist as a potential social asset was long delayed. Indeed, he was often scoffed at and sometimes even stoned. For the past century or so, however, "science" has become synonymous with "progress." It seems odd, therefore, that no very important new provisions have been made for the perpetuation of scientific endeavor. The technician's need for new scientific knowledge is rapidly increasing, and the problems of the scientist are becoming ever more complex. But even the university, though still the primary center of scientific work, has of recent years lost some of its traditional freedom to subsidize and encourage scientific endeavor.

The recent development of governmentally sponsored contract research has accelerated the trend toward large-scale, highly organized research projects in the universities. On the whole, those university scientists who have become involved in contract research have been lost to pure science. Many of them, in fact, have found themselves—pleasantly and profitably, perhaps—removed from research entirely. The military contracts are invariably big operations, and under them research is programmed. This means, in the first instance, that the research process is largely planned in advance and that the actual work is done by a large number of men, each assigned some special and limited task. It also means that the scientist who accepts responsibility for such a project inevitably becomes the administrator of a complex bureaucratic organization, whereupon he ceases to be a research scientist and is reduced to the role of a research entrepreneur.—*Richard LaPiere. The Freudian Ethic.*

Simplified management technic for the physically or mentally handicapped dental patient

Boyd F. Sprague, D.M.D., Portland, Ore.

Rectal thiopental sodium anesthesia has satisfied the demand for a safer, more gentle procedure for the handicapped dental patient. A step-by-step procedure is described for obtaining sedation or general anesthesia; any level at which the patient's cooperation is secured may be the operative stage. Among those who respond well to the procedure are the mentally retarded, mentally ill, emotionally disturbed, physically handicapped, infants, and patients with cardiac abnormalities, blood dyscrasias and glandular defects. Frequently, preoperative medications can be dispensed with. Several instruments are described which decrease the operating time and improve the standard of dentistry.

Physical restrictions and lack of cooperation of the patient are the chief obstacles in providing dentistry to most of the mentally or physically handicapped people. For many of the mentally and physically ill "cooperation" is not a word in their vocabulary, nor is it a term within their realm of understanding. And for some people, it is something outside of their physical capability.

Consequently, cooperation is something to be acquired, and the problem long has been how handicapped patients can be made operable and cooperative beyond their ability. The answer to this question is a modified, gentle and safe general anesthetic technic such as the one described in this paper. The method makes use of rectal thiopental sodium anesthesia.

The method discussed here is not a panacea for all of the problems, nor is it reasonable to think that it will replace all the technics of the past, but since its introduction to dentistry, it has satisfied a demand for a safer and a more gentle procedure for the handicapped.

This simplified management program, which enables mentally and physically handicapped patients to become operable, can be called controlled sedation, controlled induction, controlled analgesia, or controlled anesthesia, depending on the patient's level of ability to cooperate. It is a step-by-step procedure, with each step of medication establishing a higher or lower level of sedation or anesthesia based on the patient's need.

Each step of medication in this simplified management program forms the step to the next level of unconsciousness, even into surgical anesthesia. Any level at which cooperation is secured may be the operative stage, and it can be established at any time during the medication period, on the basis of the apparent pa-

tient anesthetic demand and ability to cooperate.

The uniqueness of this simplified management for handicapped patients is in the fact that medication and the anesthesia technic incorporated do not determine the depth of narcosis required, but rather the project and the ability of the patient to cooperate determines the level of unconsciousness needed.

Some of the patients who are uncooperative with dentistry and respond well to this simplified management program are the mentally retarded, mentally ill, and some of the emotionally disturbed patients.

Included in the list of the physically handicapped who benefit from this simple method are the patients who have allergic reactions to procaine and other local anesthetics. Patients with cardiac abnormalities with oxygen deficiency can be worked on safely and easily, as well as patients with blood dyscrasias and glandular defects. Cerebral palsy patients under this light, controlled plan of management become quiet and cooperative.

Infants frequently are denied dental service because of their inability to cooperate with the dentist. Physically they are handicapped in defending themselves and are frequently overpowered and forced to yield to dentistry. For many of these, this simplified program works extremely well and it could be called a step toward preventive psychiatry.

It is impossible to determine preoperatively the plane or level of cooperation that will be required for any of the patients treated by this simplified management, but whatever plane of cooperation is required, patients and parents alike appreciate this nonirritating and atraumatic method.

PREOPERATIVE CONTACT AND INSTRUCTIONS

The patient's medical history is started when the dental office first hears of him and receives his name, whether it is through a friend at the office or a parent calling on the telephone for an appointment for their child. Information often is received on this first contact that is never heard of or thought of again. Consequently, the nurse or whoever makes the first contact should be trained in getting information such as name, age, address, reasons for making the call, parents' names and telephone number, whom the patient was referred by, classification of illnesses, if any, past and present. Conversational details and points of interest are also noted on the chart. Information thus received and recorded frequently proves to be of tremendous value.

Questioning the person calling as to how they think the patient should be dealt with, often will give the dentist a lead as to a possible routine that should be followed.

The type of medication or anesthetic contemplated by the dentist should not be discussed over the telephone unless direct questions are asked.

All patients are instructed to eliminate food and water for at least four hours prior to their appointment, and a mild laxative frequently is suggested to be taken the night before the work appointment.

Someone must accompany the person having the dental work, and it is often necessary to have a third party, especially if one is to drive, leaving a third person free to hold and protect the patient during transit.

When calls are received from handicapped patients, many times they will want the first appointment to be a work appointment, also the one and only appointment, with all the work completed in the one sitting. Thus the dentist must ask questions and ascertain the patient's needs, and frequently an appointment must be made to include an examination and a first and final work period with a general anesthetic in one sitting.

THE FIRST APPOINTMENT

Appointments for the patient who is handicapped and has restricted ability should be scheduled after the lunch hour, because:

1. Some of the patient's early morning alertness has worn off, and medication is more effective.
2. Children are less resistant to sleep at the approach of nap time.
3. Laxatives taken the night before have had a chance to work.
4. Generally, anesthetists are more available for dental procedures.

The mentally ill or excitable patient responds better to sedation and light controlled general anesthesia when the doctor-patient relationship can be avoided completely. So it is recommended that casual office attire or street clothes should be the dress of the dentist, rather than the usual white or colored operating gown. This is especially true at the dentist's first contact with the patient.

At this time the patient's history can be completed and sometimes a brief look into the mouth is necessary to get some further idea of the scope of needed dental work. However, this original examination is not stressed, and thus any psychic irritation often is avoided (endogenous poisons are created during excitement periods).

Fee estimates are given when possible before the procedure has been started, but it is not infrequent with handicapped patients that controlled sedation, followed by anesthesia, must be instituted before any accurate examination or estimate can be made. The fee program should be discussed and a payment plan gone into before the patient is admitted to the preparation room. Fees need not be greatly in excess of the average dental fee schedule; since cooperation is acquired, operative speed and efficiency are also increased and the extra cost of general anesthesia can be offset by the more productive chair hours.

The patient, or parents of the patient, should be told something of the methods which can be employed to overcome the patient's inability to cooperate. It is explained that controlled rectal induction would be the most simple, the most gentle and the safest procedure that could be instituted—causing the patient a minimum of discomfort, and further, that with this procedure there is no mask used, there is no feeling of smothering, no pain, and usually no nausea or postoperative discomfort, particularly if the rectal medication is sufficient within itself, as it often is. This is such a gentle procedure that parents need not be separated from the patient.

Continued explanation should be made, telling them that the medicine is deposited into the rectum by way of a small, soft rubber catheter, and the patient soon falls asleep. In some instances the patient may become cooperative without narcosis; the objective is to work on the patient at the first level or plane of cooperation, and when the dentist considers that the patient has arrived at that level, he is either walked or carried to the operating chair where the dental work is begun.

After this has been explained to the patient or parent at hand, and his approval has been given, he is asked to sign the operative permit. At this time the question is raised as to bowel habits and whether there is any history of rectal pathologic conditions, which is one of the few contraindications for rectal barbiturate medication used with this simple procedure.

In connection with this simplified management technic, it has been found expedient to delete certain preoperative conventional procedures for added patient safety and well-being, and also to encourage the patient for subsequent procedures:

1. With controlled rectal sedation or anesthesia, atropine, scopolamine, or morphine are of no value and are avoided

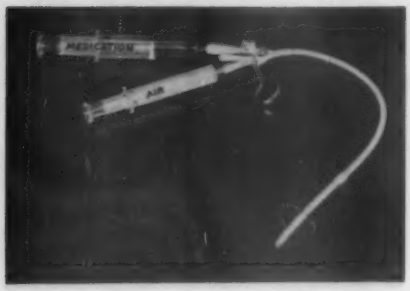


Fig. 1 • Uninflated urethral retention catheter

unless supplemental stimulating anesthetic agents are contemplated. (These drugs and their administration, singly or combined, occasionally have caused cardiac and respiratory cessation, even with well patients.)

2. Other premedication is seldom used with this simplified management procedure except some skeletal muscle relaxants such as meprobamate which on occasions will aid in treating some of the spastic patients and decrease muscular fatigue in long dental procedures. The overlaying of drugs, one upon the other, is carefully avoided. Thus any anaphylactic or synergistic drug reactions are consistently prevented.

3. Checking of the blood pressure, temperature and pulse, as well as the heart sounds, can be postponed until the patient is quiet and resting comfortably after rectal induction. Then, all readings and tests will be more reliable. This is true of blood clotting and bleeding tests also.

4. Soap enemas also are to be omitted before rectal medication with thiopental sodium, as absorption of the drug will be interfered with.

PREPARATION ROOM AND INDUCTION

The nurse will make the next contact with the patient, directing him into the preparation room, where any tight clothing is removed. Infants are put into nightgowns, and the more mature patients are asked to remove the essentials for comfort and to prevent soiling.

The patient's weight is taken by the nurse and reported to the anesthetist, who will prepare the rectal thiopental sodium, making a 20 per cent mixture by dissolving the contents of a 1.5 Gm. unit in 7.5 cc. of distilled water, which is adequate to produce basal narcosis in a patient who weighs 75 pounds. The 3 Gm. unit is sufficient for the 150 pound person.

To determine the number of cubic centimeters of 20 per cent solution to be instilled initially, the patient's weight is multiplied by 0.1, which will yield the total volume of rectal thiopental sodium in the average initial dose.

To illustrate: A child of 57 pounds times 0.1 (or simply mark off one place from the right with a decimal) would equal 5.7, which will be the number of cubic centimeters of 20 per cent solution required to produce basal anesthesia.

After the patient has been gowned and prepared (if the patient is a child, the parents should not be removed from him at this time, but are encouraged to stay), the nurse will explain the procedure of inserting the little soft rubber catheter. (The child will enjoy a story, such as one about a shoe lace that went to a party, where they had balloons and green lemonade.) The retention catheter (Fig. 1) is then lubricated with a water-soluble ointment and inserted into the rectum by the nurse, the parent, or on occasions the patient himself. The catheter previously has been marked 3 or 4 inches from the end, and it is inserted to this point. The retention balloon is then inflated with 10 to 15 cc. of air or water, and the catheter unit is then retracted back until the inflated balloon is felt pressing tight against the sphincter (Fig. 2), where the catheter unit will be allowed to remain until the completion of the present dental procedure.

At this time, the total calculated basal dose is deposited, which may create in the patient a sensation of wanting to expel, but it is explained that this urge will soon leave, and it does.

When infants up to the chronological age of six and seven, or older patients whose mental age is seven or less, are treated in this manner, there is rarely excessive fear or excitement. These patients will respond rapidly to the induction, and sound sleep can be produced in 5 to 15 minutes.

More mature and adult patients, if treated with rectal thiopental sodium, often will require up to 30 minutes to become cooperative. If sedation is a frequent daily medication habit, sleep may never be reached with the rectal anesthetic alone, nor will it be necessary to attain this objective in all instances, but full cooperation can be secured with patience and occasionally suitable anesthetic supplements.

As mentioned before, when sleep or acquired cooperation is evident, the patient's pulse, blood pressure, heart sounds, and other actions can be tested.

The patient's eyelid reflex is also checked when sleep has been produced, and if there appears too much relaxation, and narcosis is deeper than necessary, a portion of the basal dose can be withdrawn, even before the patient is moved to the operating chair. However, the patient may have to be in the sitting position for awhile to allow the instilled solution to well up over the retention balloon so that it can be drawn back into the syringe, where it is allowed to remain and be reinstilled if the need should arise.

It should be noted that patients usually respond in about three minutes after reinstillation or withdrawal of the solution, after a state of acquired cooperation has been reached. Thus many patients can be maintained on a dental cooperative level by this simple process of adding and subtracting the patient's basal dose, or portions thereof.

ANESTHESIA DURING OPERATION

When sleep or cooperation is established, the patient is moved from the prepara-

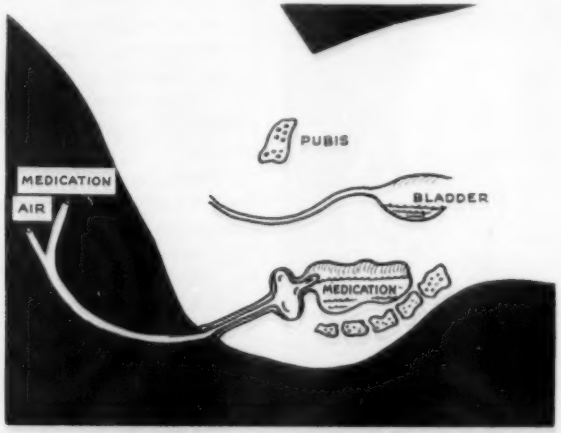


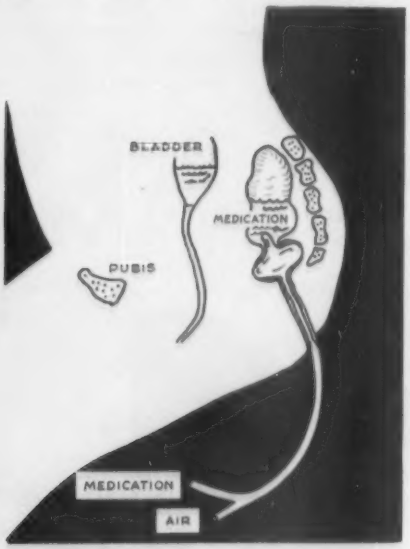
Fig. 2 • Diagram showing flow of rectal medication when injected with patient in supine position. Note location of tip of catheter above level of anesthetic solution, making it impossible to withdraw much, if any, of anesthetic solution

tion room into the operatory and the dental chair. The use of the operating table is avoided with this method of light, controlled sedation and anesthesia, because the forward-body chair position is more suitable to dentist and patient and is a safety factor within itself (Fig. 3).

The patient is set on the rectal cushion. The chair and headrest should be adjusted with suitable pillows and pads.

The proper size twin-tube oral evacuator unit (Fig. 4, above) is placed in position between the patient's jaws, and the suction volume is regulated. This is another immediate safety factor—preventing a laryngospasm and a clamping shut of the jaws, closing the airway. The saliva is eliminated from the mouth and throat, and continued free access is available to the airway.

Fig. 3 • Diagram showing anesthetic solution (rectal) when patient is placed in sitting position. Note pooling of solution directly above balloon of retention catheter. This feature of technic makes it possible to withdraw liquid anesthetics instilled into rectum of patient making it possible for more rapid recovery of patients



If sedation, induction or the general anesthesia is adequate when the patient is placed in the chair, a portion of the rectal thiopental sodium mixture may be withdrawn, as previously stated. Frequently all the injected mixture is recovered, still retaining its characteristic green color. If as much solution as is desired cannot be drawn back, it may be because the solution has not been given time to seek the new lower level, just above the retention balloon, or it may be that the catheter opening has been occluded and an additional cubic centimeter or so may have to be injected and then immediately withdrawn, drawing with it all the original solution. This operation is handled by the anesthetist, who will keep a record of the injections and withdrawals.

After the dentist has placed the bite block and suction equipment, the throat is packed off lightly with the reinforced gauze throat packs (these are Pliofilm sheets sandwiched between gauze layers). The reason for the Pliofilm packed sponge is that when these are used for throat pack during surgery, blood does not completely saturate the sponge, but dams the blood and oral secretions from the throat region more effectively than the completely absorbent sponges and packs. Further, when supplementation with gases is required, these Pliofilm sandwiched packs discourage mouth breathing.

Anesthesia or anesthesia supplementation and the dental procedure will progress according to patient demands and cooperative ability, supplementation being frequently accomplished with the nitrous oxide and oxygen machine that is capable of positive pressure and equipped with vaporizer attachments. A gas mixture supplementation is helpful and often used near the completion of a procedure to effect a faster recovery.

The need of a well-trained dental anesthetist in addition to the dental assistant is obvious.

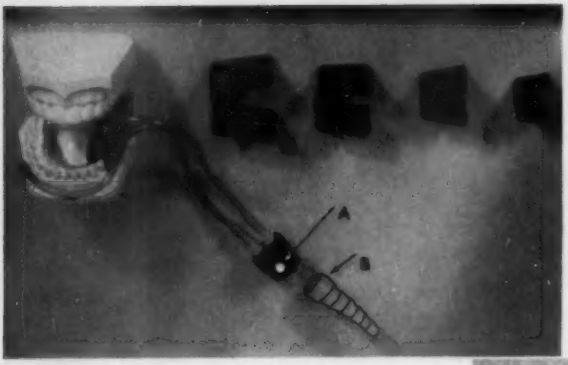


Fig. 4 • Above: Twin tube oral evacuator attached to bite block with adjustable valve for suction control (A) and plastic connector (B). Note four sizes of bite blocks. Right: Thumb valve on head of spray bottle (indicated by arrow) is bleeder-type valve. Assistant places thumb over opening, forcing air to pass through spray nozzle. Air spray is gentle yet effective

INSTRUMENTS

Operative dentistry instrument design has had a basic part in making this simplified technic workable. Operating speed seems to be the essence of success in many of these procedures, but it should not be regarded as a requirement. Some of the instruments which have decreased operating time and improved the standard of dentistry for the handicapped patients follow:

1. The twin-tube oral evacuator already mentioned and shown in Fig. 4, left, is a valuable asset in keeping the mouth and throat dry and free from saliva and oral sludge. The capacity of this one piece enables the operator to wash and spray the operative region at will when the rubber dam is not used, and it facilitates the use of the high-speed and ultrasonic devices under general anesthesia.

2. The thumb valve spray control (Fig. 4, right) helps keep sprays and cavity washings at a minimum. The thumb valve is placed on the spray bottle which is connected to a compressor pump, supplying an intermittent air surge and cutting the spray volume to half.

Oral sprays with a detergent action are most effective for rapid tooth cavity cleansing; the surface tension is reduced and material sludge of tooth grindings and mucus is more easily removed. The material thus far found to be effective is a 12.8 per cent solution of methylbenzethonium chloride, which is made into a 1:4,000 solution by dissolving one-fourth fluid ounce in a gallon of tap water. This is slightly antiseptic when used in this manner. It is also nonirritat-

ing. Even in stronger solutions, it is noncorrosive, odorless and inexpensive. When a tooth cavity is sprayed with this material, the dental sludge (mucin and grindings) is dissipated faster, giving a cleaner, clearer cavity surface view.

3. The split-loop applicator Darts no. C-4 (Fig. 5, above), is an instrument used to apply cavity liners on small or large tooth cavity surfaces; it teases and pulls the lining material much as the architect's pen.

Multiple cavity preparations treated with some of the liquid methyl calcium hydroxide preparations have decreased postoperative discomfort from the several restorations accomplished in single-sitting procedures.

4. The D-6 closed-loop carrier instrument (Fig. 5, center) is used in the placing of cement bases. It gives a more direct control of the material flow, because of the low-surface attraction of the cement substance to the instrument. The material has a greater affinity to the cavity surface. The overflowing and spreading of the cement to the cavity margins are minimized with this instrument.

Cotton rolls used in connection with operative procedures while the patient is under light, controlled sedation or anesthesia are all prepared with colored trailer strings, making them distinguishable from the white strings of throat packs.

5. The last instrument to be mentioned in connection with patient-management expediency is the Darts no. B 4 & 6 double-loop, stainless, spring steel, amalgam-carrying and carving instrument (Fig. 5, below). This instrument is used to carve or pick up soft excess amalgam or wax, avoiding dropping materials into the floor of the sleeping patient's mouth.

Other wire loop instruments of similar design have proved to be fine, rapid carving instruments.

TERMINATION OF PROCEDURE AND RECOVERY PROCESS

When the operative procedure is nearly completed, the rectal medication of thiopental sodium is withdrawn, if there appears to be sufficient residual anesthetic carry-over, which may have to last several minutes. The anesthetist will withdraw the rectal solution, measuring and comparing the amount and color to the original dose.

After the operative work has been completed, the patient's mouth and lips are well lubricated with a healing mucous membrane salve. While the dentist is completing the terminating steps, the anesthetist should be attempting to recover all the basal anesthetic dose, after which he will use as a rectal wash a previously brewed tea preparation that has been allowed to stand at room temperature for several hours or days. A double dose of this tea preparation is used, and this is then shortly withdrawn and discharged from the syringe, and the process slowly repeated. The reason for using the tea is the slight astringent and hemostatic effect it has on the rectal mucosa, which will stop the bowel absorption of further drug pickup. Also, the washing process tends to pick up and neutralize any remaining solution of medication.

The depth of anesthesia attained by rectal or intravenous barbiturates partly determines the interval required before patient response.

Patients frequently begin to stir before the dentist has completed his work when the rectal medication is withdrawn too soon.

On completion of the operative procedures on children, they are carried to bed. Adults that are able to walk to bed are allowed to do so. For those that are not able to stand, the bed is wheeled into the operating room and the patient is easily transferred from chair to cot.

All patients are laid on their right

Fig. 5 • Stainless steel wire instruments used for operative dental procedures

Split loop applicator C-4, applies liquid cavity liners, varnishes, methyl cellulose bases and so forth to exact cavity floor area without covering cavity walls or margins

Closed loop carrier D-6, used to carry and apply cement bases of deep cavities, also as an interproximal carver of soft amalgam restorations and direct inlay wax patterns

Double loop skimmer B 4 & 6, skims freshly packed material from amalgam restorations, performs preliminary carving, picks up and holds shaving within double loops, preventing added dental sludge

side, unless they have a physical disability that indicates another position during the recovery time.

The patient usually is dismissed at the end of a period equivalent to the length of time required during medication. For example, two hours' preparatory and operating time equals two hours' recovery time. The patient should respond well and be able to sit up unassisted, but he usually will require help in walking.

Infants will resist opening their eyes at times, but will object vigorously to a cold wet towel on their face. For them I wait for the open-eye reaction before discharge.

Home instructions are that they should be watched and not left alone until complete consciousness and stability have been regained.

SUMMARY AND CONCLUSION

A procedure has been described for the use of rectal thiopental sodium for general anesthesia for the handicapped dental patient. The operative procedure can be carried out with the patient in the dental chair. The following conclusions are reached:

1. A psychosomatic improvement is often noticed among the mentally or physically handicapped when dental work has been accomplished by this gentle means.

2. Sedation or general anesthesia for dental operations and surgery should be light, controlled and correlated with the patient's needs. It is inconsistent with the policies of good dentistry that the same anesthetic technic should be used for the filling or extraction of a tooth or teeth as for brain or abdominal surgery.

3. Planes or stages in which operative or surgical procedures are performed should be lowered or raised according to the patient's moment-to-moment requirement, with a gradual transition and a result that is gentle enough to be a safety factor in treating handicapped persons rather than a risk to life or mental health.

4. Controlled rectal thiopental anesthesia used alone and as the sole inducting and maintaining agent, accompanied by the safety factors mentioned in this paper, causes none of the adverse side effects commonly encountered with other general sedation or anesthesia procedures.

5. The use of preoperative medications that has become routine for the general anesthesia processes frequently can be temporarily sidestepped or even dispensed with during this simplified management of the mentally and physically handicapped; a failure to delete certain irritating and commonly used premedications may mean the difference between a calm and a stormy procedure, or success and failure.

6. It is necessary to consider and improve instruments and equipment that directly and indirectly facilitate the dental managing of handicapped people.

No. 10 S. E. Thirty-ninth Avenue

The Miracle of Life • This world, after all our science and sciences, is still a miracle, wonderful, inscrutable, magical and more, to whosoever will think of it. *Thomas Carlyle.*

Occlusal adjustment through selective grinding and splinting

Harold R. Schreiber, D.D.S., St. Louis*

A technic is described for obtaining occlusal adjustment by means of selective grinding. The scope of this operation is limited, however, and many conditions require some type of periodontal prosthesis for their correction. The fixed periodontal prosthesis is the method of choice in adjustment of occlusion.

Occlusal adjustment by means of selective grinding long has been accepted as an integral part of periodontal therapy. In the past few years opinion of selective grinding has descended from its former high pinnacle and the procedure is now being viewed in its proper perspective.

Occlusal adjustment by selective grinding is a procedure designed to eliminate occlusal interferences in various movements of the mandible with the resultant reduction of stresses to the periodontium and temporomandibular joint mechanism. It is obvious that a thorough examination and diagnosis must be made before grinding procedures are instituted. It is not only essential that the objectives to be attained for each patient be clearly realized, but that these objectives can be achieved by selective grinding.

One of the prime objectives in occlusal adjustment is the establishment of harmony in centric relation and centric occlusion. As the mandible is closed in a hinge movement, it is displaced by interceptive contacts anteriorly, laterally, posteriorly, or anterolaterally and posterolaterally.[1] The mandible is displaced anteriorly in about 70 to 75 per cent, laterally in 15 to 20 per cent and posteriorly in 5 to 10 per cent of patients requiring occlusal adjustment.

The majority of patients in whom selective grinding is useful are those in whom the mandible is displaced a small distance anteriorly. If the displacement anteriorly is of a half cusp width or greater, it is doubtful that selective grinding can achieve a matching of the inclined planes of the mandibular to the maxillary teeth. Proper intercuspation in these instances can be accomplished by periodontal prosthesis.

Patients in whom the mandible is displaced laterally can be helped by selective grinding if the amount of lateral displacement is small. If the lateral displacement is large, selective grinding will result in a space between the buccal inclined planes of the mandibular buccal cusps with the lingual inclined planes of the maxillary buccal cusps on the side of

the displacement. Again, a prosthesis or a combination of selective grinding and prosthesis is necessary.

Instances in which the mandible is displaced posteriorly are associated with closed bites, deep overbites, and temporomandibular joint disease. Selective grinding is used to a very limited extent, and in conjunction with prostheses and orthodontics in this group.

Other instances where selective grinding can be utilized are open-bite occlusions and false class III occlusions (false anterior cross-bites).[2]

Selective grinding should be performed with a coordinated plan so that each step in the procedure is followed logically by the succeeding one. Each step should accomplish a definite objective. The technic that will be described is derived from those in periodontal texts,[3-7] and from the author's own experience.

TECHNIC

Establishment of an Occlusal Plane • The establishment of an occlusal plane is concerned with the formation of a uniform plane of occlusion. Teeth which are rotated, malposed or tilted are recontoured or reshaped to establish a better alignment. Extruded teeth are leveled as much as possible to the established plane. Occasionally, the mandibular incisor plane is higher than the posterior occlusal plane and may lend itself to adjustment to the posterior plane. Extraction or restoration of teeth may be necessary at times to accomplish this first phase.

Elimination of Food Impaction • This step in the procedure deals with the elimination of the various causes of food impaction and resultant damaging effects on the gingival tissues. Uneven heights of marginal ridges not only may be interceptive contacts when the mandible is in centric position, but are factors in permitting food impaction between teeth. Reduction of the higher marginal ridge will correct this condition. Plunger cusps also should be recontoured at this time to eliminate the wedging action against the opposing teeth. Regrooving of the occlusal surface to re-establish marginal grooves, fossae and inclined planes also is indicated.

Reduction of Buccolingual Diameter • Narrowing of the buccolingual diameters of teeth brings the application of force closer to the center of the teeth. This stage deals with grinding the buccally inclined planes of the buccal cusps of the mandibular teeth and the lingually inclined planes of the lingual cusps of the maxillary teeth. The narrowing should start at the area of greatest convexity of the buccal and lingual cusps at the junction of the occlusal third with the middle third of the tooth. It should terminate at the tip or what is to be the tip of the buccal or lingual cusp. This grinding not only reduces the buccolingual width but reshapes the cusp to its original point angle shape. Regrooving of the buccal and lingual grooves accentuates food spillways which have been obliterated.

Establishment of Harmony in Centric Relation and Centric Occlusion • Once centric relation is determined, it should be transferred to casts for study and location of interceptive contacts. As mentioned previously, most patients who can be helped by selective grinding exhibit interceptive contacts that cause the mandible to slide anteriorly. Therefore, when the mandible assumes its correct centric relation, there will be a space between the mandibular and maxillary teeth as if an open-bite relationship existed. As the first group of teeth with interceptive contacts are ground, other interceptive contacts will appear. All are successively ground with a final result of simultaneous and maximum tooth contact and intercuspation. As the interceptive contacts are removed and the inclined planes of the teeth are matched, the original verti-

cal height is re-established. If the mandible is in a more retruded position, the incisal edge of the mandibular incisor teeth will be slightly more lingual to the maxillary teeth than had been true previously.

Interceptive contacts in mouths in which the mandible is displaced anteriorly most often are related to the mesially inclined planes of the maxillary lingual cusp and the distal inclined planes of the mandibular buccal cusps. In these instances either the mesially inclined plane or the distally inclined plane, or both inclined planes may be adjusted. If interceptive contacts are found on the mandibular buccal cusps, the buccally inclined planes are ground. Interceptive contacts on the maxillary lingual cusps are eliminated by grinding the lingually inclined planes. When interceptive contacts are located on the cusp tip, the dentist must decide whether to reduce the cusp height or deepen the sulcus. The relation of the cusps in lateral excursion will help guide the decision. Interceptive contacts in centric relation in the anterior area usually are eliminated by grinding the incisal edges of the mandibular teeth, and occasionally the cingulum area of the maxillary teeth.

Adjustment of Protrusive Excursion and Position • The purpose of adjustment of protrusive excursion and protrusive position is to achieve the maximum contact of the anterior teeth in the protrusive movement so that stress is distributed over as many teeth as possible. An ideal protrusive position is one in which there is cuspid-to-cuspid contact with posterior contacts if possible. There should be freedom of motion from centric position to protrusive position, with no interference. The mandibular anterior teeth should glide over the lingual surfaces of the maxillary anterior teeth with such ease that there is no perceptible movement of the teeth in their sockets. The mandibular anterior teeth should come directly forward, holding the same median line as in the centric position.

The grinding in this movement should be confined, whenever possible, to the lingual surfaces of the maxillary teeth. Grinding should be done from the area of, but not including, centric contact to the incisal edge. Once protrusive excursion is smooth and there is simultaneous contact of the mandibular and maxillary anterior teeth in protrusive position, the decision can be made as to whether further grinding in protrusive position is advisable to achieve a more favorable clinical crown-to-root ratio of the anterior teeth; this depends on the amount of periodontal breakdown, mobility pattern and overbite or overjet.

Adjustment of Later Excursion • The objective of lateral excursion adjustment is the reduction of interceptive contacts from centric position in the lateral glide movement. Reduction of tooth inclined planes in this connection places stresses more nearly parallel to the long axis of the tooth. An attempt is made to obtain simultaneous contact in lateral excursions from the cuspid back to the second molar. Grinding is initiated on the lingual aspect of the maxillary anterior teeth (usually the cuspid) if interceptive contacts are encountered, allowing the posterior teeth to come into contact. In an attempt to achieve maximum contact from the cuspid posteriorly, grinding is done on the lingually inclined planes of the maxillary buccal cusps. The lingually inclined planes of the maxillary buccal cusps are ground from the point of centric contact, but not including centric, to the tip of the cusps. As more posterior teeth come into contact and similar tooth inclined planes are being established on the lingual aspect of the maxillary buccal cusps, the distally and mesially inclined planes of the maxillary buccal cusps also are reshaped to achieve maximum contact and intercuspation. Occasionally the buccally inclined plane of the lingual cusps of the

mandibular teeth will have to be ground to secure a better working bite. Grinding to achieve a balancing side occlusion is contraindicated. If balancing contacts are interceptive, the condition must be corrected.

Reduction of Buccolingual Diameter • After the correction in lateral excursion has been made, the buccolingual diameter can be narrowed further by reduction of the maxillary buccal cusps and the mandibular lingual cusps. The objectives of narrowing buccolingual diameters have been stressed previously but another objective is added, and that is to shorten the distance of the stroke in lateral excursion. Again, lateral forces and stresses are brought closer within root range. In this correction grinding is done as described earlier in narrowing buccolingual widths but is confined to the buccally inclined planes of the maxillary buccal cusps and the lingually inclined planes of the mandibular lingual cusps. Regrooving the buccal and lingual grooves also re-establishes additional food spillways.

Polishing of Ground Surfaces • All surfaces roughened by grinding procedures should be thoroughly polished to establish smoothness of gliding tooth inclines.

CONCLUSIONS

The scope of occlusal adjustment by selective grinding obviously is limited. Conditions in which selective grinding cannot be used are those including:

1. Large displacements of the mandible anteriorly or laterally.
2. Displacements of the mandible posteriorly.
3. Deep overbites.
4. Closed bites.
5. Flat, heavily abraded occlusal surfaces.
6. Severe amounts of alveolar bone resorption (that is, large clinical crown-to-root ratio).
7. Excessive mobility of teeth.
8. Numerous open contact areas, migrated teeth.
9. Numerous edentulous areas.

The foregoing conditions require some type of periodontal prosthesis for their correction. Whereas periodontal prosthesis includes all types of operative, prosthetic and orthodontic devices, there is little doubt that the fixed periodontal prosthesis is the method of choice in the adjustment of occlusion. It is hoped that in fixed periodontal prosthesis, in addition to the benefits of the powerful splinting action, the following are attained:

1. Maximum contact and harmony in centric occlusion and centric relation.
2. Maximum contact in protrusive excursion, elimination of overbites, posterior balancing contacts.
3. Maximum contact, ideal intercuspation in lateral excursion, balancing side contacts.
4. Narrow buccolingual diameters.
5. Ideal tooth anatomy and form.
6. Ideal contact areas and marginal ridges.
7. Adequate interproximal and embrasure spaces.

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*Assistant professor of anatomy, School of Dentistry, Washington University.

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reports of councils and bureaus

Expenditures and prices for dental and other health care

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Agencies of the federal government gather data on amounts spent and changes in prices paid for consumer goods and services. Separate figures are issued for dental care and for other types of health care.

EXPENDITURES

According to the U.S. Department of Commerce, consumers paid an estimated $1,674,000,000 for dental care in 1958, an amount which was .57 per cent of all consumer expenditures and 10.2 per cent of expenditures for all types of health care (Tables 1, 2 and 3). Dental care provided under governmental and philanthropic programs is not included in this figure.

As shown in Table 1, the estimated increase in expenditures for dental care between 1956 and 1958 was very small. Estimates of expenditures for dental care are based mainly on statistics from dentists' income tax returns released by the Internal Revenue Service. When the current estimates were published, these statistics were available to the Department of Commerce for years through 1957 but not for 1958. According to the Department of Commerce, "in the absence of direct information, the preliminary consumer expenditure figure for 1958 was based on the relationship between the movements of total gross income of dentists and disposable personal income."[1]

The Department of Commerce has on several occasions revised its original estimates of consumer expenditures upon receipt of new information. It seems likely that the estimate of consumer expenditures for dental care for 1958 will be revised upward.

Based on the 1956 Survey of Dental Practice, the Bureau of Economic Research and Statistics estimated the 1955 national dental bill at $1,600,000,000. The Department of Commerce's original estimate for 1955 was $1,017,000,000, and its estimates for several earlier years were also unrealistically low. In 1958, sharp upward revisions were made in the

Table 1 • Consumer expenditures for health care, 1935–1958 (millions of dollars)

Item	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1940	1935
Dentists	1,674	1,658	1,625	1,508	1,406	1,234	1,098	997	961	920	900	784	772	419	302
Physicians	3,901	3,741	3,512	3,189	3,109	2,840	2,657	2,519	2,427	2,338	2,327	2,020	1,720	913	731
Other professional services	769	741	706	653	634	586	544	510	482	455	445	390	338	173	151
Drug preparations and sundries	3,261	3,062	2,869	2,473	2,163	2,137	2,058	1,979	1,719	1,555	1,466	1,313	1,271	635	474
Ophthalmic products and orthopedic appliances	1,101	990	814	685	595	604	580	546	486	454	431	400	396	186	131
Privately controlled hospitals and sanitariums	4,319	3,880	3,524	3,229	2,962	2,729	2,486	2,248	2,037	1,772	1,621	1,397	1,163	527	406
Medical care and hospitalization insurance*	1,359	1,210	1,076	1,090	1,056	942	749	641	629	557	559	513	444	165	93
Total	16,384	15,282	14,126	12,827	11,925	11,072	10,172	9,440	8,741	8,051	7,749	6,917	6,101	3,313	2,233

*Premiums minus claims paid.

Source: Survey of Current Business, July 1959, U.S. Income and Output (1958), and National Income, 1954 edition, publications of the Office of Business Economics, U.S. Department of Commerce.

Table 2 • Percentage distribution of the health dollar, 1935–1958

Item	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1940	1935
Dentists	10.2	10.9	11.5	11.7	11.8	11.1	10.8	10.6	11.0	11.4	11.6	11.5	12.6	13.9	13.2
Physicians	23.8	24.5	24.9	24.9	26.1	25.7	26.1	26.7	27.8	29.0	30.0	29.6	28.2	30.2	31.9
Other professional services	4.7	4.8	5.0	5.1	5.3	5.3	5.4	5.4	5.5	5.7	5.8	5.7	5.5	5.7	6.6
Drug preparations and sundries	19.9	20.0	20.3	19.3	18.1	19.3	20.2	20.9	19.7	19.3	18.9	19.3	20.8	21.0	20.7
Ophthalmic products and orthopedic appliances	6.7	6.5	5.8	5.3	5.0	5.5	5.7	5.8	5.5	5.7	5.6	5.9	6.5	6.2	5.7
Privately controlled hospitals and sanitariums	26.4	25.4	24.9	25.2	24.8	24.6	24.4	23.8	23.3	22.0	20.9	20.5	19.1	17.5	17.8
Medical care and hospitalization insurance	8.3	7.9	7.6	8.5	8.9	8.5	7.4	6.8	7.2	6.9	7.2	7.5	7.3	5.5	4.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated by Bureau of Economic Research and Statistics from data in Table 1.

Table 3 • *Percentage of total consumer expenditures spent for specified items of health care, 1935–1958*

Item	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1940	1935
Dentists	.57	.58	.60	.59	.59	.53	.50	.48	.49	.51	.51	.47	.53	.58	.54
Physicians	1.33	1.31	1.30	1.24	1.31	1.22	1.21	1.20	1.24	1.29	1.31	1.22	1.17	1.27	1.30
Other professional services	.26	.26	.26	.25	.27	.25	.25	.24	.25	.25	.25	.24	.23	.24	.27
Drug preparations and sundries	1.11	1.08	1.06	.96	.91	.92	.94	.94	.88	.86	.82	.79	.86	.88	.84
Ophthalmic products and orthopedic appliances	.38	.35	.30	.27	.25	.26	.26	.26	.25	.25	.24	.24	.27	.26	.23
Privately controlled hospitals and sanitariums	1.47	1.36	1.31	1.26	1.24	1.17	1.13	1.07	1.05	.98	.91	.85	.79	.74	.72
Medical care and hospitalization insurance	.46	.43	.40	.43	.44	.41	.34	.31	.32	.30	.31	.31	.30	.23	.16
All health care	5.59	5.37	5.23	5.00	5.01	4.76	4.63	4.50	4.48	4.44	4.35	4.12	4.15	4.20	4.06

Source: Calculated by Bureau of Economic Research and Statistics from estimates of consumer expenditures contained in the following publications of the Office of Business Economics, U.S. Department of Commerce: Survey of Current Business, July, 1959, U.S. Income and Output (1958), and National Income, 1954 edition.

estimates, bringing the 1955 estimate close to that made by the Bureau of Economic Research and Statistics.

According to the Department of Commerce estimates, between 1935 and 1958 the part of the health dollar paid to dentists declined from 13.2 cents to 10.2 cents and the part paid to physicians declined from 31.9 cents to 23.8 cents (Table 2). The percentage decline in proportion of the health dollar was greater for physicians than for dentists (Table 4). The proportionate decline was also greater for "other professional services" (osteopathic physicians, chiropractors, chiropodists and podiatrists, private duty trained nurses and miscellaneous curative and healing professions). Payments to dentists and physicians as a percentage of total consumer expenditures, however, actually increased slightly from 1935 to 1958 (Table 3).

Consumer expenditures for hospital care and health insurance have increased tremendously since 1935. Had these expenditures increased at the same rate as total consumer expenditures, payments to dentists and physicians as a proportion of the health dollar would have remained almost constant. Thus, it may be said that the decrease in proportion of the health dollar paid to dentists and physicians resulted mainly from the extraordinarily large increases in expenditures for hospital care and health insurance.

PRICE CHANGES

According to the U.S. Department of Labor, dentists' fees rose 31.4 per cent between the base period of 1947-1949 and 1958 (Table 5). During the same period, physicians' fees increased 37.0 per cent, fees for optometric examinations and eyeglasses 16.7 per cent, prescriptions and drugs 20.7 per cent and hospital rates 98.0 per cent. The index for all items (the Consumer Price Index) increased 23.5 per cent.

Prior to 1947-1949, however, dentists'

Table 4 • Percentage change in proportion of health dollar spent for specified items of health care, 1950 to 1958 and 1935 to 1958

Item	1950 to 1958	1935 to 1958
Dentists	− 7.3	−22.7
Physicians	−14.4	−25.4
Other professional services	−14.5	−28.8
Drug preparations and sundries	+ 1.0	− 3.9
Ophthalmic products and orthopedic appliances	+21.8	+17.5
Privately controlled hospital and sanitarium	+13.3	+48.3
Medical care and hospitalization insurance	+15.3	+102.4

Source: Calculated by Bureau of Economic Research and Statistics from data in Table 1.

and physicians' fees increased more slowly than the Consumer Price Index (Tables 5 and 6). In fact, for the entire period 1935-1958, dentists' fees increased only 92.7 per cent, physicians' fees 85.6 per cent and the Consumer Price Index 110.4 per cent. Highest increases were for hospital rates, which increased 320.4 per cent.

The Consumer Price Index is based on prices of some 300 items considered to be closely representative of all goods and services bought by the families of urban wage earners and clerical workers. Two of these items are one-surface amalgam fillings and simple extractions. The "weight" given to "medical care" in the Consumer Price Index in December 1958 was 5.4 per cent, meaning that medical (including dental) care was considered to represent 5.4 per cent of the typical family's budget. A weight of .6 per cent was given to fillings and .2 per cent to extractions. The weights given to the various items are changed periodically in accordance with changes in the buying practices of the people.

From time to time changes are made in the list of items priced for inclusion in the Consumer Price Index. For example, the fee for "cleaning teeth" was a component of the dental care price index until 1947. Since the early 1950's, "group hospitalization" and "multiple vitamin concentrate" have been priced and included in the medical care index.

AMOUNT OF DENTAL CARE

It will be noted in Table 7 that per capita expenditures for dental care increased from $2.38 in 1935 to $9.76 in 1958. Part of this increase represents the increase in fees and part of it represents increase in quantity of dental care.

Dividing estimated expenditures for dental care by the dental care price index removes the fee differential and yields a measure of the relative amount of dental care received over the years. The accuracy of this measure is of course limited by the accuracy of the price index as a reflection of over-all changes in dental fees and by the accuracy of the estimated expenditures for dental care.

The figures denoting amount of dental care are shown in the right-hand column of Table 7. These figures show per capita expenditures for dental care in terms of dental fees prevailing during 1947-1949. Small variations from year-to-year should be disregarded owing to the limited accuracy. There can be no doubt, however, that the per capita "consumption" of dental care has shown a steady increase. From 1935 to 1958, the amount of dental care received per capita more than doubled.

The annual "constant dollar" per capita expenditures for dental care since 1946 are shown in the graph. As a method of defining the trend, a straight line has been fitted by the method of "least squares." (The slope of the line is such that the sum of the squares of differences between original data and the fitted line is a minimum.)

Extrapolating on the basis of the least squares line indicates that the amount of dental care per capita, in terms of 1947-1949 dollars, will increase to $8.92 in 1965 and $10.62 in 1975.

The Bureau of the Census has issued four series of population projections,

Table 5 • Price indexes for items of "medical care," and Consumer Price Index, 1935–1958 (1947–1949 = 100)

Item	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1940	1935
Dentists' fees	131.4	127.4	124.4	122.0	120.9	117.0	113.3	110.9	106.9	104.4	100.3	95.2	87.9	70.1	68.2
Fillings	130.8	126.6	123.6	121.2	120.4	116.9	113.2	110.3	106.8	104.4	100.3	95.2	88.0	70.4	67.6
Extractions	135.0	131.6	128.4	126.1	124.0	118.1	113.8	112.5	107.3	104.6	100.4	95.1	87.8	68.9	67.4
Physicians' fees	137.0	132.5	127.0	123.3	119.2	115.8	112.8	108.0	104.1	102.5	100.7	96.8	91.0	74.6	73.8
General practitioners' fees	139.3	134.5	128.4	124.3	119.9	116.1	113.0	108.0	104.0	102.5	100.6	96.9	91.1	74.7	73.9
Office visit	136.3	131.4	127.1	123.7	120.4	115.8	111.9	107.5	103.8	102.4	100.8	96.8	90.9	73.9	73.3
House visit	138.2	133.1	125.3	120.7	115.9	113.5	111.0	107.7	104.3	102.3	100.1	97.6	91.9	78.0	77.2
Obstetrical care	153.8	149.8	144.5	139.8	131.2	125.4	122.7	110.9	104.2	103.1	101.7	95.2	88.6	67.1	65.5
Surgeons' fees	122.7	120.9	118.2	116.4	115.2	113.9	111.5	107.3	104.5	102.9	101.0	96.2	90.9	74.0	73.8
Appendectomy	120.1	119.6	117.6	115.2	114.9	114.0	112.0	107.4	104.2	101.8	101.0	97.3	92.9	76.1	75.4
Tonsillectomy	128.4	124.1	120.0	119.2	116.4	114.1	111.1	107.1	104.8	103.9	100.9	95.1	89.0	71.7	72.3
Optometric examination and eyeglasses	116.7	115.5	111.2	109.5	108.0	109.4	110.5	109.2	104.5	103.5	100.2	96.2	92.5	82.6	80.5
Hospital rates	198.0	187.3	173.3	164.4	156.8	148.2	139.5	126.9	114.6	110.4	102.1	87.4	73.3	50.4	47.1
Men's pay ward	215.6	202.3	183.8	173.9	164.4	155.1	145.3	131.2	117.2	111.9	102.3	85.8	69.9	46.0	42.7
Semi-private room	193.5	183.0	170.0	160.0	153.5	145.9	138.3	126.6	114.6	110.7	101.9	87.4	74.4	51.8	48.3
Private room	182.4	174.2	164.4	157.7	150.9	142.1	134.0	122.5	112.1	108.9	102.1	89.0	76.2	54.2	50.7
Prescriptions and drugs	120.7	116.7	113.7	111.2	110.1	108.9	107.9	106.9	103.9	102.7	101.2	96.1	89.5	83.2	83.0
Prescriptions	130.7	125.0	121.0	117.3	115.8	113.6	113.6	112.2	106.9	104.2	101.7	94.0	85.5	76.5	75.5
Aspirin tablets	108.0	102.3	100.7	100.0	98.6	99.8	99.5	99.4	99.9	100.3	100.3	99.5	98.5	97.9	98.0
Milk of magnesia	136.3	132.8	123.0	114.1	112.3	108.2	101.4	100.7	100.5	100.2	100.0	99.7	92.6	89.1	94.1
All "medical care"	144.4	138.0	132.6	128.0	125.2	121.3	117.2	111.1	106.0	104.1	100.9	94.9	87.7	72.7	71.4
Consumer Price Index	123.5	120.2	116.2	114.5	114.8	114.4	113.5	111.0	102.8	101.8	102.8	95.5	83.4	59.9	58.7

Source: Consumer Price Index, Price Indexes for Selected Items and Groups, Bureau of Labor Statistics, U.S. Department of Labor.

Table 6 • Percentage increases in price indexes for items of "medical care" and for Consumer Price Index, for specified periods of time

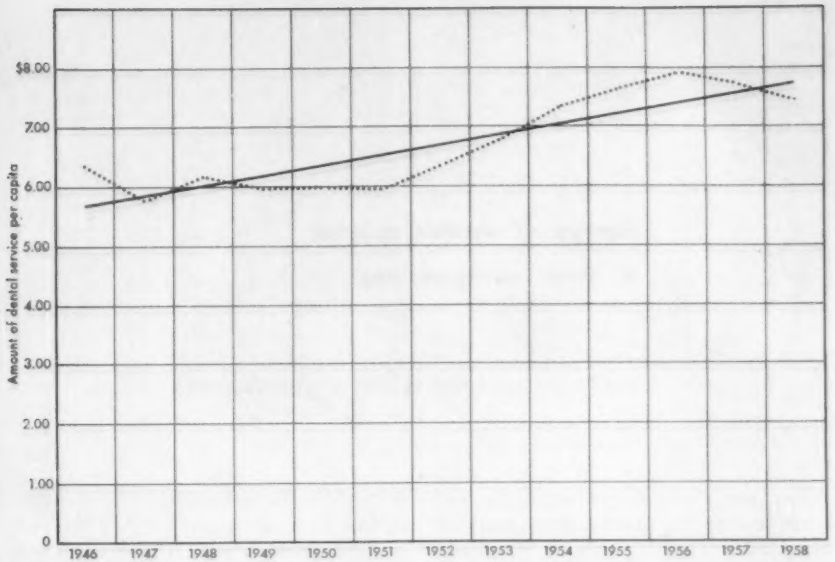
Item	1954–1958	1950–1958	1946–1958	1935–1958
Dentists' fees	8.7	22.9	49.5	92.7
Fillings	8.6	22.5	48.6	93.5
Extractions	8.9	25.8	53.8	100.3
Physicians' fees	14.9	31.6	50.5	85.6
General practitioners' fees	16.2	33.9	52.9	88.5
Office visit	13.2	31.3	49.9	85.9
House visit	19.2	32.5	50.4	79.0
Obstetrical care	17.2	47.6	73.6	134.8
Surgeons' fees	6.5	17.4	35.0	66.3
Appendectomy	4.5	15.3	29.3	59.3
Tonsillectomy	10.3	22.5	44.3	77.6
Optometric examination and eyeglasses	8.1	11.7	26.2	45.0
Hospital rates	26.3	72.8	170.1	320.4
Men's pay ward	31.1	84.0	208.4	404.9
Semi-private room	26.1	68.8	160.1	300.6
Private room	20.9	62.7	139.4	259.8
Prescriptions and drugs	9.6	16.2	34.9	45.4
Prescriptions	12.9	22.3	52.9	73.1
Aspirin tablets	9.5	8.1	9.6	10.2
Milk of magnesia	21.4	35.6	47.2	44.8
All "medical care"	15.3	36.2	64.7	102.2
Consumer Price Index	7.6	20.1	48.1	110.4

Source: Calculated by Bureau of Economic Research and Statistics from data in Table 5.

Table 7 • Expenditures and price index for dental care and a measure of the relative amount of dental service received per capita, 1935–58

Year	Estimated civilian population, July 1	Consumer expenditures for dental care (millions of dollars)	(A) Per capita expenditures for dental care	(B) Dental care price index	Amount of dental service per capita: $(A) \div \frac{(B)}{100}$
1958	171,433,000	1,674	$9.76	131.4	$7.43
1957	168,368,000	1,658	9.85	127.4	7.73
1956	165,341,000	1,625	9.83	124.4	7.90
1955	162,306,000	1,508	9.29	122.0	7.61
1954	159,086,000	1,406	8.84	120.9	7.31
1953	156,046,000	1,234	7.91	117.0	6.76
1952	153,366,000	1,098	7.16	113.3	6.32
1951	151,082,000	997	6.60	110.9	5.95
1950	150,202,000	961	6.40	106.9	5.99
1949	147,578,000	920	6.23	104.4	5.97
1948	145,168,000	900	6.20	100.3	6.18
1947	142,566,000	784	5.50	95.2	5.78
1946	138,385,000	772	5.58	87.9	6.35
1940	131,658,000	419	3.18	70.1	4.54
1935	127,099,000	302	2.38	68.2	3.49

Sources: Population figures are from Current Population Reports, Series P-25, Bureau of the Census, U.S. Department of Commerce. Estimates of consumer expenditures for dental care are from the following publications of the Office of Business Economics, U.S. Department of Commerce: National Income, 1954 edition; U.S. Income and Output (1958), and Survey of Current Business, July 1959. Dental care price indexes are from Consumer Price Index. Price Indexes for Selected Items and Groups, Bureau of Labor Statistics, U.S. Department of Labor.



Amount of dental service per capita, 1946-1958 (per capita expenditures divided by price index) and straight trend line fitted by method of least squares

Table 8 • Consumer expenditures for selected items, 1958

Item	Amount (millions of dollars)	Per cent of total consumer expenditures
Tobacco products	6,376	2.18
Alcoholic beverages	9,210	3.14
Recreation	16,973	5.79
Admissions to spectator amusements	1,736	.59
Pari-mutuel net receipts	447	.15
Personal care	4,255	1.45
Toilet articles and preparations	2,351	.80
Barbershops, beauty parlors, and baths	1,904	.65
Jewelry and watches	1,937	.66
Health care	16,384	5.59
Physicians	3,901	1.33
Dentists	1,674	.57
Hospitals and sanitariums	4,319	1.47

Source: Survey of Current Business, July 1959, Office of Business Economics, U.S. Department of Commerce.

based on various assumptions regarding fertility. Series II is often regarded as the "most likely" projection. Under Series II, the total population will reach 195,700,000 in 1965 and 235,200,000 in 1975, compared to 174,064,000 on July 1, 1958.

If the population increases at the rate indicated by Series II, and if per capita consumption of dental care increases at the rate indicated by the least squares line, total amount of dental care to be provided in 1965 will be 35 per cent more than in 1958 and the amount to be provided in 1975 will be 93 per cent more than in 1958.

OTHER EXPENDITURES

It is of interest to compare expenditures for dental care with certain other expenditures (Table 8). The United States population in 1958 spent 5.5 times as much for alcoholic beverages, and 3.8 times as much for tobacco, as for dental care. Expenditures for recreation were slightly more than expenditures for all types of health care.

1. Personal communication from Louis J. Paradiso, acting director, Office of Business Economics, U. S. Department of Commerce, August 21, 1959.

Survey of dentist opinion

V. Oral roentgenology

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

It has been shown in earlier surveys, and borne out by this survey, that nearly all nonsalaried dentists own x-ray machines. Of the dentists in the current survey who answered the question on number of x-ray machines, only 3.3 per cent did not own a machine (Table 43). (Five per cent of the respondents, mainly salaried dentists, did not answer this question.)

By age, the percentage of dentists not owning x-ray machines was greatest among dentists over 65 (15.7 per cent), followed by dentists 60 to 64 (7.8 per cent) and dentists under 30 (6.7 per cent). In each of the age groups between these two extremes, the percentage was 2.5 or lower.

Ownership of two x-ray machines was reported by 15.6 per cent of the dentists and three machines by 2.4 per cent. It is estimated that the 81,000 nonsalaried dentists in 1958 owned 95,000 x-ray machines.

Respondents were asked to furnish certain descriptive data about their x-ray machines. The descriptive information was tabulated for only two of the machines owned by any dentist. However, this accounts for 5,527, or 93 per cent, of the 5,933 machines owned by survey participants.

Tables 44, 45 and 46 present data on the age of x-ray machines in use. It will be noted in Table 44 that "year of manufacture" was not given for 21.7 per cent of the x-ray machines. It is probably safe to assume that most of these were older machines and that the dentists did not remember, or could not determine, year of manufacture. Unfortunately, the "no answer" rate for most of the questions relating to description of machines was rather high.

The mean age of all x-ray machines for which year of manufacture was given was 9.6 years (Tables 45 and 46). For dentists under 30, the mean was 3.4 years. The mean increased with age of dentist rather sharply to age 45. Thereafter the mean increased slowly, probably because of two factors: (1) a large percentage of dentists over 45 had replaced their original machines with new ones, and (2) a large percentage of those over 45 who had not replaced their machines did not record year of manufacture on the questionnaire.

Year of purchase was the same as year of manufacture for 80.8 per cent of the x-ray machines. For 11.3 per cent, year of manufacture was one year earlier than year of purchase. For the remaining 7.9 per cent, the difference between year of purchase and year of manufacture varied widely. These figures indicate that roughly nine out of ten machines were

Table 43 • Percentage distribution of dentists according to number of x-ray machines owned, by age

Age	No. of x-ray machines owned					Total
	0	1	2	3	4 or more	
–29	6.7	83.5	8.9	.7	.2	100.0
30–34	1.5	80.3	15.9	2.0	.3	100.0
35–39	1.2	76.6	19.1	2.6	.5	100.0
40–44	2.5	75.5	19.6	2.3	.1	100.0
45–49	1.3	75.4	20.6	1.9	.8	100.0
50–54	2.3	81.6	13.1	2.6	.4	100.0
55–59	2.1	81.1	13.9	2.4	.5	100.0
60–64	7.8	82.4	8.8	1.0	.0	100.0
65–	15.7	80.0	3.9	.4	.0	100.0
All ages	3.3	78.7	15.6	2.0	.4	100.0

Table 44 • Percentage distribution of x-ray machines by year manufactured

Year manufactured	Per cent
–1924	.4
1925–1929	1.9
1930–1934	2.6
1935–1939	6.3
1940–1944	7.1
1945–1949	18.9
1950–1954	20.6
1955–1958	20.5
No answer	21.7
Total	100.0

Table 45 • Mean number of x-ray machines owned and mean age of x-ray machines, by age of dentist

Age of dentist	Mean no. of machines	Mean age of machines (years)
–29	1.0	3.4
30–34	1.2	5.3
35–39	1.3	8.0
40–44	1.2	10.7
45–49	1.3	13.7
50–54	1.2	13.7
55–59	1.2	14.6
60–64	1.0	15.0
65–	.9	16.2
All ages	1.2	9.6

purchased new. (Some machines are purchased new the year after year of manufacture.)

Table 46 • Mean number of x-ray machines owned and mean age of x-ray machines, by region

Region	Mean no. of machines	Mean age of machines (years)
New England	1.3	11.5
Middle East	1.2	10.7
Southeast	1.2	8.1
Southwest	1.3	7.8
Central	1.1	10.3
Northwest	1.1	8.7
Far West	1.2	8.3
United States	1.2	9.6

Table 47 • Percentage of x-ray machines having lead diaphragm (collimation), by age of dentist

Age of dentist	Yes	No	No answer	Total
–29	74.4	7.1	18.5	100.0
30–34	72.2	8.7	19.1	100.0
35–39	71.1	8.3	20.6	100.0
40–44	64.2	11.9	23.9	100.0
45–49	59.2	12.4	28.4	100.0
50–54	61.5	10.0	28.5	100.0
55–59	51.4	9.4	39.2	100.0
60–64	50.5	12.3	37.2	100.0
65–	42.0	7.1	50.9	100.0
Total	64.1	9.6	26.3	100.0

For those dentists who furnished information on the amount of filtration, the mean total amount of filtration per x-ray machine was 1.9 mm. of aluminum. The mean amount of filtration added to the machine after installation was 1.4 mm. of aluminum. Variation in total filtration and in filtration added according to age of dentist or region of the country was not significant.

Dentists were asked whether their x-ray machines were equipped with a lead diaphragm (collimation) (Table 47). Replies varied considerably with age, "yes" being answered by about three fourths of the youngest dentists compared to 42.0 per cent of dentists over 65. About one fourth of all dentists did not answer the question.

The length of the timer cord de-

Table 48 • Percentage distribution of x-ray machines according to length of timer cord

Length in feet	Per cent
–3	1.0
4–5	13.9
6–7	33.8
8–9	13.1
10–14	16.6
15–19	6.1
20–	2.4
No answer	13.1
Total	100.0

Table 49 • Percentage distribution of dentists according to speed of x-ray film used, by age of dentist

Age	Speed of film				Total
	Slow	Medium	Fast	No answer	
–29	2.0	25.4	71.0	1.6	100.0
30–34	.6	22.8	72.3	4.3	100.0
35–39	.9	21.5	71.4	6.2	100.0
40–44	.5	22.3	71.0	6.2	100.0
45–49	1.3	21.5	73.7	3.5	100.0
50–54	1.4	23.5	66.9	8.2	100.0
55–59	1.3	20.7	68.5	9.5	100.0
60–64	1.7	20.7	66.1	11.5	100.0
65–	.4	20.8	59.6	19.2	100.0
All ages	1.0	22.3	69.9	6.8	100.0

Table 50 • Percentage distribution of dentists according to proportion of patients showing increased concern over dental x-rays as a health hazard during recent years

Proportion of patients	Per cent of dentists
All	.2
Three fourths	1.9
Half	6.6
One fourth	12.7
One tenth	18.7
Less than one tenth	32.6
None	19.8
No answer	7.5
Total	100.0

termines how far the operator can stand away from the x-ray machine. Great variation was reported in the length of timer cords (Table 48). The mean length for all machines was 8.5 feet, but varied with age of dentist from 9.9 feet for dentists under 30 to 7.4 feet for dentists over 65.

Respondents were asked to estimate how far they stood from the patient's head during x-ray exposure. The mean was 6.1 feet. This figure, too, was highest among the younger dentists (7.2 feet) and lowest among the older dentists (5.2 feet).

Seven of every 10 dentists reported using "fast" x-ray film, 22.3 per cent "medium" film and only 1.0 per cent "slow" film (Table 49).

The percentage of dentists reporting they currently subscribed to a film badge service was 7.6 per cent for all ages combined. The figure was 6.1 per cent for dentists under 30, between 8 and 9 per cent for dentists between 30 and 55, then declined to 2.9 per cent for dentists over 65. There was considerable variation in this figure by region, with only 4.2 per cent of dentists in the Northwest, about 6 per cent in the Southeast and Southwest, and 11.5 per cent in the Far West subscribing to a film badge service. Those who did not currently subscribe were asked whether they had ever subscribed to a film badge service, to which 17.3 per cent answered "yes," 76.4 per cent "no" and 6.3 per cent did not answer. Again the Far West was high with 26.5 per cent and the Northwest was low with 9.5 per cent answering "yes."

Respondents were asked to estimate the percentage of their patients showing increased concern over dental x-rays as a health hazard during recent years (Table 50). One half of the dentists reported that one tenth or less of their patients had shown increased concern and another 19.8 per cent replied "none." About one of every 11 dentists reported that half or more of his patients had expressed increased concern.

Not many patients refuse to have roent-

Table 51 • Percentage distribution of dentists according to number of patients who refused to have x-ray pictures taken during the last year because they were considered dangerous to health, by age of dentist

Number of patients	Age of dentist									All ages
	-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-	
0	50.9	43.8	43.2	45.5	50.5	57.6	70.9	62.9	66.7	51.1
1	12.6	11.3	12.4	11.8	13.4	9.9	7.0	9.7	5.3	11.0
2	10.0	11.8	12.2	11.9	10.7	8.1	6.8	6.3	4.2	9.9
3	4.5	5.7	5.2	3.9	2.5	3.2	1.5	2.5	1.0	3.9
4	2.8	3.3	2.6	2.8	2.3	2.6	.7	.6	.0	2.4
5-9	5.7	9.8	9.2	8.0	6.6	4.6	2.0	4.1	1.0	6.7
10-14	5.7	5.6	6.1	6.3	5.4	3.6	2.0	1.6	.0	4.7
15-19	.6	1.3	.4	.9	1.2	1.0	.3	.0	.0	.7
20-24	.2	1.2	1.6	.7	1.2	1.4	.3	.3	.4	1.0
25-	.8	1.6	2.6	2.2	1.7	1.2	1.0	.0	.4	1.6
No answer	6.2	4.6	4.5	6.0	4.5	6.8	7.5	12.0	21.0	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean	2.1	3.1	3.2	3.0	2.9	2.4	1.3	.9	.5	2.5

Table 52 • Percentage distribution of dentists according to replies to the question "Do you hold the film in the patient's mouth while the x-ray is being taken?" by age

Age	Frequently	Occasionally	Never	No answer	Total
-29	.0	4.7	93.4	1.9	100.0
30-34	.1	6.9	90.7	2.3	100.0
35-39	.1	9.5	88.5	1.9	100.0
40-44	.6	9.7	86.4	3.3	100.0
45-49	.6	14.0	84.1	1.3	100.0
50-54	.4	10.3	85.1	4.2	100.0
55-59	.2	8.3	86.7	4.8	100.0
60-64	1.3	11.0	78.3	9.4	100.0
65-	1.1	9.1	66.0	23.8	100.0
Total	.4	9.1	86.1	4.4	100.0

Table 53 • Percentage of dentists answering "yes" to the question "Have you ever developed an x-ray burn on your fingers?" by age

Age	Per cent
-29	.0
30-34	.7
35-39	.7
40-44	.9
45-49	2.3
50-54	3.2
55-59	1.8
60-64	5.3
65-	4.6
Total	1.7

genograms taken because of danger to their health (Table 51). The mean for all dentists owning x-ray machines was 2.5 patients during the course of a year. This figure varied somewhat with age, which undoubtedly results partly from the fact that the average number of patients seen varies with the age of the dentist. Regionally, the mean number of patients refusing to have roentgenograms taken was highest in the Middle East (3.5) and the Far West (3.2) and lowest in the Southwest (1.5) and Northwest (1.7).

Dentists who owned x-ray machines were asked "has your amount of usage of x-rays changed during the last year?" Two thirds of the dentists checked "no, it has remained the same," one fifth checked "yes, it has increased," and one

tenth indicated it had decreased. Increased x-ray usage was reported by a greater number of the younger than of the older dentists.

One of the survey questions was "do you hold the film in the patient's mouth while the x-ray is being taken?" About 86 per cent checked "never," 9.1 per cent "occasionally" and .4 per cent "frequently" (Table 52). The percentage of dentists who answered "never" declined with age from 93.4 per cent for dentists under 30 to 66.0 per cent for dentists over 65.

In reply to the question "have you ever developed an x-ray burn on your fingers?" 1.7 per cent of the respondents checked "yes" (Table 53). None of the dentists under 30, but about 5 per cent of the dentists over 60, had experienced an x-ray burn. Those who had experienced burns were asked how many years they had been using dental x-ray before the burn occurred. The mean was 14.5 years.

The analysis of the Survey of Dentist Opinion will be continued in a subsequent issue of THE JOURNAL.

Progress report on certification program for dental laboratory technicians

COUNCIL ON DENTAL EDUCATION
COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS
BUREAU OF PUBLIC INFORMATION

The purpose of this joint report is to present a progress report on the certification program for dental laboratory technicians.

Within the past year or so, 1,600 dental laboratory technicians have earned the right to call themselves "Certified Dental Technicians." This is great and significant progress for a program that came into being as recently as the annual session of the American Dental Association in 1957 at Miami Beach. At that time, the House of Delegates approved basic requirements for the conduct and operation of a sound program of certification for dental laboratory technicians, and in that same year, the National Association of Dental Laboratories also approved such a program and established a National Board for Certification which would conduct a program under basic rules established by the dental profession. This Certification Board gave its first examination in Boston, October, 1958. Since that time dental laboratory technicians and owners of commercial laboratories have shown great interest in this program. At the present time, approximately 1,600 technicians have demonstrated by experience, examination, and testimony from members of the dental profession, that they possess the technical competence, judgment, and high ethical standards needed to qualify for this high honor.

In July, 1959, the *NADL Journal* pub-

lished a supplement containing the first of a two part official "Roster of Certified Dental Technicians." Part two of the Roster was subsequently published in the August, 1959 issue. Lists of certified dental technicians, so recognized by their own Association, have been distributed to state associations of the N.A.D.L. Further, the dental profession, through the joint efforts of the Council on Dental Education, the Council on Dental Trade and Laboratory Relations and the Bureau of Public Information, are now acquainting the members of the dental profession with the progress of this certification program. To accomplish this objective, state and local dental societies will receive copies of the official Roster, as published by the National Association of Dental Laboratories.

The program for certifying dental laboratory technicians has been the result of many conferences between representatives of the dental profession and the dental laboratory craft. Although the program is conducted by an agency of the National Association of Dental Laboratories, namely, the National Board for Certification, it is conducted according to principles and philosophies that have been approved by the American Dental Association. The bylaws and the operational rules of the Certification Board are revaluated periodically by the Council on Dental Education. Representatives of this Council meet with the Certification Board and with the N.A.D.L. Executive Council to study the progress of the certification program and to offer advice in developing future plans and operations for it. It should be clearly emphasized that the certification of dental laboratory technicians is, in effect, a joint project of the dental profession and the dental laboratory craft.

During the early development stages of certification, provision was made for laboratory owners and their key personnel to be certified without submitting evidence of formal education in dental laboratory technology. In the first series of examinations, long term experience was accepted by the Board as a substitute for educational experience and training that will ultimately become the primary requirement. Thus, the 1,600 technicians recently certified have been qualified by virtue of experience rather than education and are referred to as "grandfather" technicians, qualifying under a "waiver clause" of the bylaws. The majority from this group are certified as "generalist" technicians, indicating their competence and knowledge in the broad field of dental laboratory technology. Most of the generalist technicians are expected to serve as key personnel and supervisors in the laboratories.

The current program also provides for certification of those who can demonstrate competence in complete denture, partial denture, crown and bridge fabrication and in ceramics technic. Undoubtedly, the majority of technicians to be certified in the future will be those qualified in these special areas; however, it is also expected that many will wish to qualify themselves as generalists. By December 31, 1963, formal educational experience will become a requirement for certification and educational qualifications will not be waived in favor of experience, as is now possible.

Technicians who become certified, whether during the present "waiver" period or later, must prove their competence not only by passing comprehensive examinations successfully but also by demonstrating an understanding of the ethical standards of the craft and a knowledge of the relationship that should exist among the members of the dental health team and, more particularly, between the dentist and the dental laboratory technician. Also, in order to qualify for certification, the applicants must present recommendations from three members of the dental profession who are familiar with their work and with their relations with the dental profession.

An important feature of the present

program is that certification is now established on an annual basis. A certified dental technician is required to recertify himself each year in order to maintain this status. To be recertified, he must pay an annual fee and also demonstrate that he has advanced himself by further study, by attending clinics, and being active in his own organization. Also, he must show evidence of continuing to abide by high ethical standards.

The National Board for Certification is not only a board for conducting examinations; it is an agency which will also serve the certified dental technician by providing him with study materials, advice and counseling that will help him attain an optimum of efficiency in his work, so that he may serve the dental profession and the laboratory craft effectively and with high ethical standards. The certifying board is now planning to release some of its first educational material and expects to release additional study material as a regular service to those continuing to maintain certification status.

As the certification program continues to grow and to move ahead, the members of the dental profession, the owners of commercial laboratories, and the dental laboratory technicians themselves will come to have a growing appreciation of the meaning and significance of certification. The current program is extremely important to the steady and rapid growth of dental service to be rendered by the dental profession through the help and cooperation of the dental laboratory craft. Through its definition and identification of the functions of the dental laboratory technician, through its identification of the skills and abilities that technicians must master, the certification program will help members of the dental profession to a better understanding of responsibilities that can be given to the dental laboratory technician, so that members of this auxiliary group may serve the profession better as a member of the dental health team. Through the objectives of the program and through the delineation of the kinds of skills required, a further result of assisting schools to plan educational programs and experience is to be noted. New educational programs will help to train future technicians in the development of knowledge and skills that are needed throughout the industry and by the profession. It is expected, too, that certification will help in the selection and recruitment of future manpower reserves for this important dental auxiliary group.

A subsequent report of the Council on Dental Education, and joint reports from agencies identified with this report, will be published to keep the dental profession informed of educational programs being designed for prospective dental laboratory technicians. Also, future reports will be made concerning continuing education or refresher training programs which will be needed to keep technicians informed and alerted to rapid advances being made in the development of dental materials and in the fields of technics and fabrication.

Considerable interest has been shown by the members of the dental profession in the current certification program for dental laboratory technicians. It is noted that this program will continue to be conducted in close cooperation between the dental profession and the dental laboratory craft through frequent conferences between representatives of the American Dental Association and the National Association of Dental Laboratories.

Group Life Insurance Program—later may be too late

COUNCIL ON INSURANCE

In June of this year, The Great-West Life Assurance Company, which underwrites and administers the Association's Group Life Insurance Program, received an unusual and gratifying letter from a firm of insurance consultants in California. The nature of the letter was such as to prompt the company to forward it to the Council on Insurance. The Council, in turn, believes that it deserves the attention of the entire membership because it so dramatically illustrates the importance of early and adequate planning for the financial protection of one's family.

The letter was as follows:

Gentlemen:

We wish to acknowledge receipt of your letter of . . . enclosing your check for $20,029.40 in full payment of the above claim, as filed in our letter of . . ., 1959.

As you can see from the claim papers, young Dr. . . . had very little other life insurance. He was an excellent dentist, a good family provider and quite a wonderful person but his heavy practice left him little time to become well insured or well informed by direct contact with regular life insurance agents. He did not realize how very quickly a robust young person can succumb to disease.

So you can well understand what a blessing your very liberal and economical new A.D.A. group program has proven to be to this young widow and her two small children.

Mrs. . . . joins me in thanking you for your cooperation and your promptness in this matter and in wishing your company every success.

The Council did not wish to publish this letter without first securing permission from its author. In his letter granting such permission, the gentleman said:

. . . For some 40 years we have been dealing with all kinds and types of group insurance programs and we feel that your Insurance Council has done an outstanding job in negotiating such a superior program with a top-notch insurance company. Such a combination of values does not come about by accident.

So if our letter should in any way help any of your short-sighted and reluctant members to recognize that fact or to realize the pointless folly of procrastination and delay in so important and vital a matter—one hanging on so slender a thread—then we would be delighted.

The significance of these letters is that the young dentist who so unfortunately passed away at the age of 37 had at least had the foresight to join the Association's life insurance program while he was physically acceptable, thus providing his wife and children with a measure of security that they might not otherwise have enjoyed.

During the recent Centennial Session in New York City, The Great-West Life Assurance Company maintained an exhibit at the Coliseum. The activity at the exhibit was tremendous. The men attending the booth ran out of literature several times, notwithstanding the receipt of fresh supplies from Chicago daily. The director

of group insurance for the company spent a large amount of time at the booth meeting Association members and discussing a variety of subjects with them. In his report of these activities to the Council, he made the following thought-provoking observations:

> One lesson I have learned. A considerable number of men have deferred joining the program thinking that this way they would save their premiums for a few years. Unfortunately some of these men discovered that in the meantime they became uninsurable. One man actually revealed his own intentions in this regard by saying that he would stay out of the program for at least another five or ten years; that he would still be insurable and would join and pay only the premiums he would be paying anyway, in the meantime having saved himself the premiums for five or ten years. He calculates, of course, that he is not going to be suddenly struck down by an accident before he can make application and that he is not going to become uninsurable so as to be precluded from joining later on. From those who are struck down by accident we get no complaints, of course, because they cannot speak to us from the grave. But from those who delay in the hope of saving some premiums and joining later, but who become uninsurable in the meantime, we do get complaints generated usually by remorse and disappointment in their own miscalculation.

The Group Life Insurance Program constitutes one of the outstanding benefits of membership in the Association. Its true effectiveness as a benefit, however, can be measured only in terms of the number of members who avail themselves of it. This applies, in fact, not only with respect to the Association program but also in regard to life insurance programs sponsored by constituent and component societies.

The Council has noted that the current statistics on Association membership disclose that more than 23,500 members are in the 30 to 39 age bracket. The men in this group are the ones who normally can be considered as not in the best relative position financially because of the substantial costs involved in simultaneously developing a practice and raising a family. They are the men whose families would be most seriously affected by the early death of the breadwinner; they are the members who should be most concerned about the status of their life insurance protection. Yet of this group, only 6,000 are enrolled in the Group Life Insurance Program!

The Council believes that the Association's program should serve as the basic plan of life insurance for every member of the Association, and particularly for the younger members. In terms of providing the most pure protection for the least premium, the program is superior to any available or likely to be available to the members on any insurance market. For this reason, the Council is concerned about the apparently widespread disregard for the necessity of joining the program—or some program—at an early age. The consequences of failure to do so can be distressingly tragic.

A significantly illustrative hypothetical case can be developed around the circumstances of the young doctor from California who passed away at the age of 37. He may have enrolled in the program while in dental school at which time the benefits offered amounted only to $3,000. He may have enrolled sometime after graduation, between 1952 and 1956, after the benefits had been increased to $5,000 and the accidental death benefit had been added. In either event, when he applied for and was accepted into the program, he had accomplished two things: First, he had taken an important step toward assuring his family of the necessary protection against his early demise. Second, he had guaranteed to both himself and his family that should he subsequently become uninsurable, he would still be eligible to participate in any future program-wide increases in available benefits. Thus, if the doctor became physically unacceptable for life insurance after enrolling in the Association's program, as may well have happened, he was still able to take advantage of the increase

in benefits under the program to $10,000 in 1956 and to $20,000 in January, 1959. Had he not acted when he did, on the other hand, his widow could have been left virtually penniless and without the means to cope with the responsibility of raising their children.

In the Association's program, and in most of the constituent society sponsored programs, a member has available sound life insurance protection at the lowest possible cost. In addition, he has the security of belonging to a consumer-group plan, any expansion in benefits of which will inure to him irrespective of changes in his personal health circumstances. To disregard these opportunities, or worse yet, to gamble them against the fortunes of fate for the sake of saving a comparative pittance, is the utmost folly. A few dollars saved today can mean thousands lost tomorrow.

Supplement to List of Certified Dental Materials

COUNCIL ON DENTAL RESEARCH

ADDITIONS • Since publication of the most recent List of Certified Dental Materials, revised to May 1, 1959 (J.A.D.A. 59:130 July 1959), the following materials which conform to American Dental Association Specifications have been added.

CERTIFIED DENTURE BASE RESINS
(A.D.A. SPECIFICATION NO. 12, SECOND REVISION)
TYPE I, HEAT-CURING

Material	*Manufacturer or distributor*
Duolite 2	Acralite Company, Inc.

CERTIFIED ACRYLIC RESIN TEETH
(A.D.A. SPECIFICATION NO. 15)
TYPE I, ANTERIOR

Material	*Manufacturer or distributor*
Dura-Blend	Myerson Tooth Corporation
Trubyte Biotone	Dentists' Supply Company

TYPE II—POSTERIOR—ANATOMIC

Material	*Manufacturer or distributor*
Dura-Blend FLX	Myerson Tooth Corporation

TYPE III—POSTERIOR—NONANATOMIC

Material	*Manufacturer or distributor*
Dura-Blend Shear Kusp	Myerson Tooth Corporation

Prospects for an adequate listing of dental diseases

BUREAU OF LIBRARY AND INDEXING SERVICE

A complete listing of dental and oral diseases, disorders and anomalies is a constant unfulfilled need of institutional dentists. One of the commonest requests received by the Bureau of Library and Indexing Service is, "where can such a listing suitable for recording in hospitals and other residential institutions be obtained?" These requests come from such agencies as Veterans Administration facilities, research clinics, government institutions, and dentists in charge of hospital dental services. Important as such a listing and classification is, the answer to requests at present is that no such adequate list exists.

The present means intended to meet this demand is *Standard Nomenclature of Diseases and Operations,* published by the American Medical Association and now in its fourth edition, 1952. The work is intended to cover all untoward conditions in the entire body and therefore purports to include those relating to the gingiva and teeth as well as to other parts of the body with which the dentist is concerned. Every entity is listed separately as a "diagnosis," designated by a word or phrase that is oftentimes more of a description in common language than a technical term. These diagnoses are grouped under various etiologic heads and under each head the arrangement is alphabetical and therefore more or less haphazard.

Every diagnosis is coded numerically for machine recording. Two systems are employed. One is known as the International Statistical Classification and need not be considered here. The other is a system devised specially for *Standard Nomenclature.* In the code number, the diagnosis is assigned first of all to the part of the body in which the condition is located. For this purpose a topographical inventory of the bodily structures is made, consisting of ten main divisions with numerous subdivisions. The main divisions with their numbers are:

0—Body as a whole, including the psyche
1—Integumentary system
2—Musculoskeletal system
3—Respiratory system
4—Cardiovascular system
5—Hemic and lymphatic system
6—Digestive system
7—Urogenital system
8—Endocrine system
9—Nervous system
x—Organs of special sense

The teeth and gingiva belong to the digestive system. The digestive system, generally unspecified, is designated 60. The mouth is 61. The teeth are 613 and the parts of the teeth are designated by additional decimals. After the topographical code number, the diagnosis is

coded by etiology. The etiologic classes with their numbers are as follows:

0—Diseases due to prenatal influence
1—Diseases due to a lower plant or animal parasite
2—Diseases due to a higher plant or animal parasite
3—Diseases due to intoxication
4—Diseases due to trauma or physical agent
50—Diseases secondary to circulatory disturbance
55—Diseases secondary to disturbance of innervation or of psychic control
6—Diseases due to or consisting of static mechanical abnormality (obstruction, calculus, displacement or gross change in form) due to unknown cause
7—Diseases due to disorder of metabolism, growth or nutrition
8—New growths
9—Diseases due to unknown or uncertain cause with the structural reaction (degenerative, infiltrative, inflammatory, proliferative, sclerotic or reparative) manifest; hereditary and familial diseases of this nature
x—Diseases due to unknown or uncertain cause with the functional reaction alone manifest; hereditary and familial diseases of this nature
y—Diseases of undetermined cause

Mottled enamel, or endemic fluorosis, is coded 6133 to indicate enamel as the location, followed by 3215 indicating by the 3 a disease of intoxication. An inorganic acid is represented by 32, a halogen by 321 and fluorine specifically by 3215.

The listing and classification of operations is similar. The operation is first classified topographically and then according to the character of the operation. The main headings for character of operations are:

0—Incision
1—Excision
2—Amputation
3—Introduction
4—Endoscopy
5—Repair
6—Destruction
7—Suture
8—Manipulation

Although the listing, classification and coding of *Standard Nomenclature* is far from perfect, it is the best general means of recording bodily conditions yet devised. Its greatest shortcomings are present in the sections interesting to dentists and the most disadvantageous feature is the inadequacy of the listing, both of the diagnoses and the operations. The unsatisfactoriness of the present edition of *Standard Nomenclature* will be better understood if some of its specific inadequacies are pointed out. In the topographical list for the mouth, several important structures recognized clinically by the dentist have been omitted; namely, the vestibule, dentin, the dental arches (as a unit of teeth, partial and complete), the root and crown of the tooth as structural parts. Some of these parts have been omitted, doubtless because the anatomist and surgeon does not regard them as structural units.

Many commonly recognized clinical entities do not appear among the diagnoses. Necrotizing ulcerative gingivitis (Vincent's gingivitis) is not specified, as is also the case with herpetic gingivostomatitis. Several of the conditions due to drugs and chemicals, such as Dilantin (diphenylhydantoin sodium) hyperplasia of the gingiva, are omitted. Concrescence (cementum fusion) is not distinguished from gemination of teeth.

As regards etiology, the plan throughout the work of assigning a diagnosis to only one etiology is open to criticism. Some of the assigned etiologies are unacceptable. Caries furnishes a good example; it is assigned to diseases due to unknown or uncertain causes. If any etiology in the dental field is justified, it is that of caries as due to microorganisms.

These various defects and inadequacies of *Standard Nomenclature* make it impossible for the dentist examiner to use *Standard Nomenclature* in the fourth edition in the recording of dental diagnoses. However, there is some prospect that the new fifth edition to be published

January 1, 1961 will prove usable. The Dental Subcommittee was given a much freer hand than in the past in the revision of the dental sections of the work. As a consequence, many changes have been made. The number of diagnoses has been greatly increased. In the fourth edition there are 66, whereas in the fifth edition there will be 87. The etiologies have been brought more nearly into line with modern dental clinical thinking. Not all conditions recognized by some clinicians are included, but it is hoped that for most purposes of record the revision of 1961 will prove at least temporarily usable.

American Dental Association Film Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The following films have been added to the Film Library and are listed in the new film catalogue, *Audio Visual Materials in Dentistry*. A selected film list, "Dental Information Films Available for Television—1959," has been prepared by the Film Library and will be sent on request.

Local Anesthesia in Dentistry for Children • 16 mm., sound, color, 22 minutes. Produced in 1959 by Niels Bjorn Jorgenson, D.D.S., College of Medical Evangelists with a grant from Cooke-Waite, Inc. Rental from A.D.A. Film Library, $4.50.

The anatomical approach to the use of a local anesthetic for children is given. Each principal injection used in dentistry is presented as a unit. Comparisons are made between adult and children's skulls; landmarks are shown and the nerves are traced in the dissection of a wet specimen. The use of a topical anesthetic and the injection technics are clinically demonstrated in detail. The reactions of the child patients are carefully noted. Specific cautions are made. Special emphasis is given to the pterygomandibular space and the role that it plays in local anesthesia.

The Clinical Use of Ultra High Speed Technics • 16 mm., sound, color, 40 minutes. Produced in 1959 by Jerome L. Fechtner, D.D.S. Rental from A.D.A. Film Library, $4.50.

Six different ultra-high-speed dental machines are demonstrated and compared. The unique features of the machines are noted and comment is made on the effect of speed, pressure, torque and temperature on the cutting effectiveness of both steel and carbide burs. Operational procedures are demonstrated in the mouth and insights are provided for the new operator.

The narration is rapid. The comparative evaluation of the features of the high speed machines is interesting in relation to the evaluation of this equipment. A sequence from this film is used in the film, "Centennial Session," sponsored by Johnson & Johnson and available on free loan from the A.D.A. Film Library.

Sights and Sounds Around the Dental Chair • 16 mm., sound, color, 10:32 minutes, cleared for TV. Produced in 1958 by the Texas State Department of Health. Rental from A.D.A. Film Library, $3.50.

A ten year old child is introduced to the sights and sounds of the dental office. The equipment and instruments are explained.

Roentgenograms are taken. No operative dentistry is performed.

Visually, this film can and should be used with children of primary school age, but the language level is more suitable to an older group.

Dentistry for Children (Today's Dentistry Series) • 16 mm., sound, black and white kinescope, 28:22 minutes, restricted clearance for TV. Produced in 1959 by the St. Louis Dental Society on KETC-TV. Rental from A.D.A. Film Library, $2.50.

The first half of the program is an interview with a parent in which an explanation of the necessity of dental care is followed by the presentation of a treatment plan. The second half highlights various clinical aspects of treatment. The questions, "How did the trouble occur?" and "How much will it cost?" are discussed. The formula: sweets + bacteria + teeth = dental decay, is presented. Diet, toothbrushing and regular dental checkups are stressed.

Pattern of a Profession • 16 mm., sound, color, 51 minute (DH 45) and 27 minute (DH 46) versions are available; cleared for TV. Produced in 1959 by the American Dental Association with grants from Church & Dwight and Fund for Dental Education. A.D.A. Film Library, free loan.

This film dramatizes the importance of the mouth as a vital organ of the body. The importance of the profession behind the man who treats the mouth is a theme that makes the film valuable in vocational guidance. The education of the dentist, research, practice, public health service and the professional organizations are exemplified. An interrelation of professions is shown when a cleft palate case is presented.

Regional Block Anesthesia • 16 mm., sound, color, 22 minutes. Produced in 1959 by William S. Derrick, M.D., and Astra Pharmaceutical Products, Inc. Rental from A.D.A. Film Library, $2.50.

A lecture type review of various methods utilized for intraoral blocks in local anesthesia is presented. An outline of the anatomy is followed by a clinical demonstration of the injection technics. Indications, precautions and complications as well as drugs and resuscitation equipment are discussed.

Four additional 16 mm., black and white, kinescope recordings from the 1958 Massachusetts Dental Society television clinics have been made available by Astra Pharmaceutical Products. These films are available for rental from the A.D.A. Film Library and are described in the film catalog. The titles and rental fees are:

Clinical Management of Fractured Incisors, 45 minutes, $2.50.
Frenectomy, 23 minutes, $2.50.
Root Resection—Indirect Technique, 31 minutes, $2.50.
The Unembellished Gingivectomy—An Important Periodontal Treatment Technique, 24 minutes, $2.50.

300,000 RPM in Oral Surgery • 16 mm., sound, color, 20 minutes. Produced in 1959 by Robert M. Hall, D.D.S., Shadyside Hospital, Pittsburgh, and Weber Dental Manufacturing Company. Free loan from the Weber Co. and A.D.A. Film Library, courtesy of Weber Dental Mfg. Co.

A new technic in the surgical reduction of bone is demonstrated. The technic and new instrumentation were developed through a modification of the Weber air turbine unit. The modified, mobile unit and surgical burs are shown. The instrumentation is demonstrated on simulated models of two impactions. A clinical demonstration is given of the removal of two impactions and the reduction of two tori. Particular attention is paid to the "wiping away of bone." The material is well presented and the use of simulated models is effective. Film rating: 119/27 (119 out of a possible score of 150/27 ballots tabulated).

In connection with the Association's restrictive policy on the distribution of films containing advertising, commercial interests have raised the question of the kind of film that would be accepted for distribution by the American Dental Association Film Library. The films, "300,000 RPM in Oral Surgery," and "Local Anesthesia in Dentistry for Children," are outstanding examples of an acceptable treatment of subjects that have obvious commercial implications. The combination of commercial interest and professional integrity has produced scientific films that make a definite contribution to "education beyond the usual level."

editorials

At last dentistry's plea heard (faintly) by F.T.C.

The recent disclosure that a number of television programs were more entertaining than honest may have a greater cleansing action on advertising than the mere removal of dirty fingerprints from the TV screen.. The investigators have brought out into open discussion a situation about which all thoughtful Americans have long been concerned—the hoaxes perpetrated on the public by some zealous advertisers whose interest in sales far outweighs their interest in truth.

The dental profession is particularly pleased to see the concern expressed by persons high in federal and commercial circles over the untruths, half truths, unsupported claims and undelivered promises made on the air and in the press by the promoters of some dental products.

That the distorted commercial airwaves have reached and aroused Washington is evidenced by a promise made November 1 by Earl W. Kinter, chairman of the Federal Trade Commission, that his radio and television monitor staff will be more than doubled for as long as is necessary to achieve a very important improvement in television advertising. "Too many commercials exaggerate, irritate and nauseate" he stated and warned that the broadcasting industry must cooperate with the Federal Trade Commission "to screen out as a matter of enlightened self interest the offensive advertising that manages to skirt the law."

The public indignation created by the TV quiz show scandals has not only pressured the Federal Trade Commission into action, it has punctured the hard hide of the advertising industry itself. Donald S. Frost, vice-president of Bristol-Myers Company and new chairman of the Association of National Advertisers, openly acknowledges that today all advertising "stands on the dock of public scrutiny." It is up to the advertising fraternity, he says, "to set our own house in order . . . to make sure that all of our actions can stand up to the gaze of public scrutiny [and] . . . obtain the seal of public approval. Because if we don't someone else is going to do it for us."

No one will ever know how much deceitful advertising and deceptive promotion costs the nation in dollars and cents. Neither will anyone ever know how much such frauds cost the public in lowered health and lost lives. The American Arthritis and Rheumatism Foundation estimates that such frauds cost five million American sufferers of arthritis 250 million dollars annually.

The grave concern over deceptive advertising now being expressed in federal and commercial circles only echoes the concern long voiced by the American Dental Association. For many years, as Harry Lyons, former president of the Association, told a Congressional Committee July 11, 1958, the nation has "witnessed promotion of therapeutic dentifrices . . . with unsupported claims of great promise. None has survived the test of time and use." On that occasion, as on previous occasions, the Association's plea on behalf of honest advertising of dental products fell on deaf ears. No longer are the ears deaf nor the minds behind the ears closed.

Every cloud has a silver lining. Let us hope that the one now hanging heavily over the advertising world is no exception.

A salute to the dental industry

The Centennial Session of the American Dental Association must not be allowed to pass into history without a warm acknowledgement from the nation's dentists to the nation's dental and allied industries. Without their generous financial support, neither the Centennial Session of the Association nor the forty-seventh annual session of the Fédération Dentaire Internationale would have enjoyed such overwhelming successes.

It is estimated that the dental industry contributed at least half a million dollars to assure that the two great meetings held concurrently in New York City in September would be of such scientific and social quality that they always will be remembered by the 35,000 persons who were fortunate enough to attend.

The roll call of contributing companies and trade associations is too long to list here, but it has been duly reported in the *Souvenir Program* of the Centennial Session and duly recorded in the archives of the Association. The Association further affirmed its appreciation by presenting fittingly inscribed memorial plaques to various commercial and auxiliary associations during the opening days of the Centennial Session.

The dental and allied industries provided substantial financial support, through the purchase of advertising space, for the *Preliminary Program* and the *Souvenir Program;* many of the commercial exhibits had historical themes which made them more interesting to viewers. In addition, the dental industry wholly or partially sponsored the following Centennial projects: a 51 minute version and a 28 minute version of a motion-picture film on the profession entitled "Patterns of a Profession"; the television films "The Case of the Missing Tooth" and "A New Day in Dentistry"; a musical program at Carnegie Hall; a documentary film record of the Centennial Session; travel grants to many participants from other countries; radio transcriptions and television spot announcements; subscriptions to all dental schools abroad for the

Journal of Dental Education; the Centennial student clinic program; the simultaneous translation service; newspaper cartoons and press releases saluting the Centennial; teaching fellowships; the souvenir program at the International Health Luncheon; distribution of sightseeing maps of New York City; funds to support the science fair program; a Centennial teaching fund, and distribution of Centennial souvenir match books, letter openers and portfolios.

Great as was the monetary value of these contributions, even greater was the closer working relationship between the profession and the industry brought about by their joint efforts on behalf of the Centennial—a relationship which speaks well for increased progress during the Association's second century ahead.

Dihydrostreptomycin: its use in dentistry rarely justified

Alarming evidence of hearing loss caused by even small doses of dihydrostreptomycin administered for short periods of time has recently come to light in medical circles. Fortunately the use of dihydrostreptomycin in dentistry to date has been rather limited. However, because a few dentists have employed it prophylactically, or for the treatment of infection, this warning is issued to prevent members of the profession from innocently subjecting their patients to hearing impairment.

Thirty-two cases of dihydrostreptomycin deafness were reported recently in the *Journal of the American Medical Association.*[1] The authors of the article point out that the ototoxicity resulting from the drug is particularly insidious because hearing loss may not become apparent for weeks or months following even a short course of therapy—one involving not more than a total dosage of 1 to 3 Gm.

The hearing impairment is permanent, bilateral and principally in the high frequency ranges, although the loss may involve all frequency ranges. In many instances mild or moderate hearing deficiency, as determined by air-conduction audiograms, is accompanied by a disproportionate impairment of speech discrimination. The loss of ability to understand speech reduces the effective use of hearing aids. Unfortunately there is no effective treatment known for the victims.

For several years *Accepted Dental Remedies,* published by the Council on Dental Therapeutics of the American Dental Association, has carried a statement on the potential hazards of streptomycin and dihydrostreptomycin therapy. Included is the following warning: "Usually these [toxic] effects are seen after an extended course of therapy but may appear after relatively short exposure to these antibiotics."[2] Despite the wide dissemination of this precaution among the profession a few articles on the dental use of dihydrostreptomycin have appeared recently in dental publications without adequate warning of the dangers involved.

The following preparations all contain dihydrostreptomycin in combination with

penicillin and the use of each has been followed by hearing loss: Bicillimycin, Cillimycin, Combiotic, Crysdimycin, Dicrysticin, Dihydrocillin, Distrycillin, Durycin, SRD and Strocillin. Although only one of the 32 cases of dihydrostreptomycin deafness cited in the *Journal of the American Medical Association*[1] was of dental origin, the fact that one such case came to the attention of these particular physicians warrants the assumption that more may exist, the etiology of which may never be known.

Inasmuch as there are many other therapeutic agents available, the effectiveness and safety of which have been proved, the use of dihydrostreptomycin in dentistry is rarely justified.

1. Shambaugh, G. E., Jr., and others. Dihydrostreptomycin deafness. J.A.M.A. 170:1657 Aug. 1, 1959.
2. American Dental Association. Council on Dental Therapeutics. Accepted dental remedies. Chicago, American Dental Association, 1959, p. 73.

The Association enters its second century: new goals to strive for

This being the last month of the last year of the Association's first century, THE JOURNAL would be remiss if it failed to mention the historic occasion. However, so much has been published of late on the progress of dentistry since 1859 that it would seem unnecessary to recapitulate that progress here.

It is far more important that the Association look forward into its second century and consider the things yet to be done: the perfection of pedodontics and the complete understanding by both the public and the profession of its importance to general health; the discovery of a practical anticariogenic measure—more effective, even, than fluoridation—which will protect man from his dietary indiscretions; a complete understanding of the etiology of all forms of periodontal disturbances including a full understanding of the relationship of such disturbances to general physical disorders; the satisfactory integration of dentistry in hospital and nursing home services; the development of gerodontics and the extension of dental service to all who want such service by means of various types of remunerative plans—prepayment, postpayment, individual and group insurance.

The progress made by dentistry in the technical, operative and therapeutic branches during the past one hundred years warrants the conviction that similar, perhaps greater, progress will be made in the socioeconomic aspects of dentistry during the century that lies ahead.

Remarks of the Vice President of the United States at the Centennial Session of the American Dental Association

Richard M. Nixon, Washington, D. C.

Mr. President, distinguished guests and members of the American Dental Association: May I say first how very honored I am to be made an honorary member of this Association. I don't know how I can qualify except to say I have spent a lot of time in dental offices during my life. As a matter of fact, when I was a freshman in college, I went out for basketball and I was no better in that than in any other sport. I earned no letter of any kind so you have an idea of my athletic abilities. I remember on one occasion my lip collided with another man's elbow when he was shooting for a goal and I attempted to guard him. The result is that I have some very tricky bridgework in the front of my mouth and consequently every time I visit my dentist, he says, "You know, Mr. Vice-President, whenever I see a picture of you it makes me proud of my handiwork." So whatever my smile is, I owe it to my dentist.

I am sure that most of you in this audience would assume there could be nothing in common between the meeting of the American Dental Association in New York this week and the arrival in Washington tomorrow of Moscow's man with a mission, Mr. Krushchev, except perhaps that the Russians got to the moon first, but the American Dental Association got to this ballroom first.

But there is another similarity that I would like to mention that might not have occurred to you. In the same year your organization was founded, a century ago, Karl Marx published a book entitled, "Contribution to the Critique of Political Economy," in which he set forth some of the basic ideas of the World Communist movement which Mr. Krushchev heads today. Under the circumstances it seems particularly appropriate to discuss his visit and to try to put it in its proper perspective.

I know that there are some who can see no good and potentially a great deal of harm coming from the visit. We can certainly understand the bitter feelings of the thousands of Hungarians and other refugees who came to the United States from Eastern Europe toward the man whom many of them hold responsible for the death, destruction and foreign domination which has been brought to their homelands. But we should have very little patience for others who would seek to suggest that the mere visit of Mr. Khrushchev might have the effect of weakening

the will of the American people to resist the aggressive tactics of the Communists at home and abroad.

Americans are naturally friendly and trusting but they are not going to collapse in their opposition to Communism merely because the leader of International Communism waves at them when he passes in an open car. Memories of the Korean War, the Berlin Blockade, and incidents of Communist espionage in the United States, are too fresh in the memories of our people for them to be taken in by words of peace and good will unless there are deeds to back them up.

On the other extreme, there are those who see this visit itself, clearly apart from any results which might flow from it, as being the opening of a new era of sweetness and light, and as indicating a basic change in the attitude and policies of the Communist leaders. They seem to assume that if we treat Mr. Khrushchev well, give him a good impression of the United States, and convince him that we are really for peace, he may soften his rigid positions and the differences between us will eventually melt away.

This kind of thinking is incredibly naïve and completely fails to take into account the character both of the man who is visiting us and of the ideology which he represents. The differences between the Free World and the Communist World are not the result of misunderstanding; they are the product of a deliberate Soviet policy of expanding Communist influence and domination by every possible means in all parts of the world.

We must not lose sight of the fact that it was Mr. Khrushchev's unprovoked unilateral action which created the crisis of Berlin—one of the main subjects for consideration at this meeting. As Henry Kissinger said in his very penetrating analysis of this problem in a recent article in the *New York Times Magazine*, "We must guard against succumbing to the illusion of relaxation while the causes of the cold war remain unsolved and new crises build up in an atmosphere of blandness and normalcy." Protestations of good will, personal charm and affability must never be confused with a change of attitude.

If neither of these extreme positions is right, what should the attitude of the American people be toward this exchange of visits? In finding the answer to this question I think we should first analyze the man who is visiting us and the mission which brings him here.

These personal characteristics were those that impressed me the most when I met him. He has tremendous vitality and physical energy. His mental reactions are keen and quick. He is aggressive and resourceful in debate—always on the offensive. He is an uninhibited extrovert with a rare gift for interpolating salty statements and humorous anecdotes into his speeches and conversations. If my own experience is any guide, there is never a dull moment when he's around!

While at times he may appear to be emotional and impetuous, I found that in private conversation when the chips were down he was a cold, calculating, tough-minded advocate of his point of view.

In appraising his overall ability, I recall a very revealing conversation I had with a European diplomat shortly after Mr. Khrushchev came to power. At that time, after his first visit to Yugoslavia there were some observers who tended to write him off as an emotionally unstable, uneducated individual who would not be able to hold his own in world councils. My friend told me that, in his opinion, it was a grave error to draw this conclusion. He said, "Anyone who has fought his way up through the jungle warfare of the Communist hierarchy until he reached the top of the heap and has survived forty years of purges, intrigue and plotting, simply has to be a man to reckon with." I think most of us would

agree that his analysis has proved to be correct.

He has more uncontrolled power in his hands than any leader in the history of the world. This does not mean that he does not consult with others in his government. But all of those who have participated in conferences with him where men like Mr. Mikoyan and Mr. Kozlov have also been present have noted, as I did, that Mr. Khrushchev does all the talking that amounts to anything. Mr. Mikoyan and Mr. Kozlov were there not to advise him but to agree with him.

He is, to use his own words, a "hopeless" Communist. This means that everything he sees and hears in the United States will tend to be magnified or compressed so that it fits the classic Communist picture of a non-Communist society.

What does this man who has never visited our country think of the United States? He knows that we are militarily strong. While he may overestimate his strength and underestimate ours, he recognizes no nation can start a war today without suffering terrible destruction in return. He also knows that our economy is rich and productive. He admits this when he sets as the Soviet goal, catching up with and passing the United States in producing consumer goods.

He does not need to be convinced that the government and people of the United States want peace. On the other hand, the danger is that he may believe we want peace so much we will pay any price to get it, including surrender at the conference table.

And this brings us to what I believe is one of the major reasons for inviting him to come to the United States. While his hard-headed realism forces him to conclude correctly that we are militarily and economically strong, his Communist fanaticism leads him into another conclusion which is completely false—that the American political and economic system that has created this military and industrial might is so plagued with weaknesses and injustices that the American people may have the strength but not the will to do what is necessary to defend their vital interests.

And it is easy to understand why he makes this mistake when we examine his beliefs about life in the United States—that the United States is a "paradise for the rich and a hell for the poor," that we live under a "system by which millions of people are enslaved by a comparatively small handful of exploiters; a system in which poverty and mass unemployment reign." In other words, Mr. Khrushchev's picture of life in this and other non-Communist countries is hopelessly out of date. Because it is the same picture Karl Marx painted a hundred years ago and Marx's description even then was wrong in major respects.

Didn't Mr. Mikoyan and Mr. Kozlov set him straight when they returned to the Soviet Union from their trips? The answer, in my opinion, is that they, too, are Communists and he is the boss. There is always the temptation to tell the boss what he wants and expects to hear—and where a Communist boss is concerned, this is the rule rather than the exception.

Will Mr. Khrushchev's brief stay in the United States change his views significantly on this score? As a Communist he will not and cannot admit that the Communist predictions with regard to the eventual collapse of capitalism are being proved false in this country.

But we should not overlook another characteristic of Mr. Khrushchev which I noted time after time in my talks with him. While he is badly misinformed about life in the United States, he is an intensely pragmatic and curious man who likes to see for himself. And he believes what he sees far more than what he hears. I am convinced that as he sees and feels the basic strength of our country and the will of our people he will return to the Soviet Union with a very different picture in his mind than he had before he came.

If a man is to have such awesome

power as Mr. Khrushchev possesses, it is far better that he base his decisions on firsthand knowledge of the United States and its strength rather than on second hand reports which must be filtered through the wall of secrecy and suspicion that surrounds the Kremlin.

While the understanding which may result from this visit should not by itself be expected to assure peace, there is good reason to hope that the misunderstanding and miscalculation which could lead to war can be substantially reduced.

How will Mr. Khrushchev be received by the American people? He can expect to be treated with courtesy and propriety because that is the American way to receive a guest who represents a foreign government no matter how much we may disagree with him. On the other hand, courtesy and politeness do not and should not mean any hesitancy on our part in keeping the record straight where controversial issues are concerned.

When I was in the Soviet Union there was seldom an occasion, including even the toasts at luncheons or dinners, when my hosts missed an opportunity to make points for their side and to question the U.S. position. At times the interests of diplomacy are best served by ignoring a controversial comment in order to avoid an unpleasant discussion. I think, however, this practice is a grave mistake where men like Mr. Khrushchev are concerned.

As you know, he and his people are very fond of proverbs and one of their favorites is "Silence is a sign of agreement." This does not mean that we should get into a debate on every picayune issue which might be raised. But it does mean that where major issues are concerned and our position comes under attack, either publicly or privately, we should answer courteously but as effectively and as articulately as we possibly can.

We must realize, just as does Mr. Khrushchev, that a great battle of ideas is going on in the world today. When we fail to answer, only one side of the case is presented to the world. We in the Free World must learn that we cannot stand silently by while the disciples of Communism beat their drums in the world forum.

I further believe that Mr. Khrushchev will respect us more if we talk to him in this manner. It does not help the cause of peace to gloss over differences, to indicate that there is agreement when there actually is not, to sweep unpleasant facts under the rug. When we do this it is as if one of you were to give a patient with an aching tooth a shot of novocain and send him away without drilling out the decay which was causing the trouble. If we are to make any progress in reaching agreements on the very great issues which divide us, we must put them out on the table and debate them fully and frankly.

What are some of the things Mr. Khrushchev can learn about the United States while he is here?

He will find that the American government and people are sincerely dedicated to peace but that no greater mistake could be made than to consider this dedication to be a sign of softness or weakness in our determination to defend our vital interests.

He will find that the leaders of our two great political parties vigorously debate their differences in public but that they are united in supporting the President in the firm stand he has taken on Berlin and other world issues.

He will find that more than our material wealth we Americans value our spiritual and moral heritage—our freedom to criticize our government officials, freedom of choice in elections, freedom to strike for better wages or working conditions, freedom to worship God as we choose, equal justice under law.

He will find that we are convinced of the superiority of our political and economic system but far from wanting to impose it upon anyone else, the very essence of our belief is that every people

should have the right to choose the kind of system it wants without any foreign intervention.

He will find that the American people have much in common with the Russian people, that our hearts go out to them for their terrible suffering in World War II, that we respect them for the progress they have made, and that we hope that in the years ahead more and more of their talents and resources can be directed into the production of the consumer goods which the American people enjoy in such abundance today.

He will find that because we are a free people with free, uncensored press, radio and television facilities, we Americans have access to a wealth of information on world affairs.

I recall in my discussion with Mr. Khrushchev at the American Exhibition that I told him he should never say anything in the USSR that he did not expect to be read or heard in the United States. In that same spirit, I would suggest that if he does repeat here some of his recent statements, he should expect to be questioned with regard to facts available to us which differ substantially from his.

If, for example, he should say as he has previously, "The Soviet Union has no bases in foreign countries," he will naturally be asked how that statement squares with the fact that the Soviet Union has 325,000 men in East Germany, 35,000 men in Poland, and 55,000 men in Hungary.

If he should say again that "peaceful co-existence has always been the policy of the Soviet state" and that this policy "presupposes an obligation on the part of all states to desist from violating each other's territorial integrity and sovereignty in any form and under any pretext whatsoever," a question which will naturally come to the minds of Americans is—how does he reconcile this statement with the fact of the USSR's support of aggression in Korea and its use of the veto in an attempt to block a United Nations investigation of foreign intervention in Laos.

If he should say also that "peaceful co-existence means the renunciation of interference in the internal affairs of other countries with the object of altering their system of government or mode of life or for any other motives," he cannot expect Americans to ignore the incontrovertible evidence of instance after instance in which the Communist Party of the USSR, which Mr. Khrushchev heads, has given support to the subversive activities of the Communist Party of the United States.

I do not raise these points in any spirit of belligerence or provocation but only because I believe it is essential that in our relations with the Soviet Union we be frank and honest in expressing our different points of view.

From the discussion of these issues, we can see that there are great differences between us. On the other hand, may I hasten to point out that there are today some great forces working for peace which, in the end, I think will be decisive in insuring a peaceful settlement of differences even as great as these.

One of the greatest deterrents of war is the awesome destructive power of atomic weapons. The time when one nation could gain an advantage over another which would assure victory in war in any real sense is now gone. Mr. Khrushchev himself has said, "Should a world war break out, no country would be able to shut itself off from a crushing blow." This in effect means that war on a world scale is obsolete as a method of settlement of international disputes.

There is, second, the moral force of the people of the world. Part of the reason for my friendly reception by the Russian people was that they genuinely like Americans. But in great part it was undoubtedly due to the fact that the Russian people, along with all other peoples on this earth, want peace. And even in a dictatorship,

the intense desire of people for peace cannot be ignored.

There is next the United Nations. It is far from being a perfect instrument for settling international disputes. But in providing a forum for discussion of differences and for mobilizing world opinion against the use of force as an instrument of national policy, it renders a significant service to the cause of peace.

Finally, there is the President of the United States. As he goes into this conference with Mr. Khrushchev, as his trip to Europe so dramatically proved, he will speak for a united Free World. As a man who knows war so well and who is, therefore, even more dedicated to peace, his moral and intellectual leadership will be a great and decisive factor in attaining the objective of peace with justice.

On what basis can we have peace in the world? Mr. Khrushchev has suggested that peaceful co-existence is the only answer.

The difficulty with his suggestion is not with the words but with his interpretation of the words. When you cut through the verbiage and double talk, peaceful co-existence, Communist-style, means two worlds with a wall of hate and fear between them. Because Mr. Khrushchev says that since the historical process is irreversible the Communist world should be immune from change but the Free World must expect conflict and revolution until it, too, achieves its destiny of Communist domination.

And so this means peace for the Communist world and turmoil in the non-Communist world. And it means also the seal of approval on Communist domination of the satellite countries of Eastern Europe and a year-round hunting license for Communist subversion and disruption in the Free World.

What should our answer be? We should not stop simply by objecting to the negative concept of peaceful co-existence as it is proposed by Mr. Khrushchev.

Our answer should be a world in which each people has a right to choose the kind of economic and social system it desires without any foreign interference and in which there is free communication and exchange of ideas between all peoples on the earth.

Mr. Khrushchev has also said, let us have peaceful competition—"let us compete in ham, sugar and tomatoes." Our answer should be that we welcome peaceful competition but we say extend it to include the spiritual as well as the material aspects of our civilization. Let us compete in seeing who can produce a better life not only in terms of shelter, food and clothing but in terms of human freedom and individual dignity.

What will be the result of this competition?

Just as Mr. Khrushchev expresses his belief that our grandchildren will live under Communism, we should just as vigorously express our conviction that freedom and not Communism is the wave of the future.

The record shows that where men have a choice between Communism and freedom, they choose freedom. Three million North Koreans, one million North Vietnamese, three million East Germans, two-hundred-thousand Hungarians chose freedom when they had the chance to make the choice.

As long as Americans remain true to the principles of freedom which are our heritage, we can face any competition that may lie ahead with faith and confidence.

Presented at the Opening Meeting of the Centennial Session of the American Dental Association, New York, N. Y., September 14, 1959.

international correspondence

News from Great Britain

As the writer has been away for five weeks in the United States, during which time he had the exciting and interesting experience of taking part in the Centennial Session of the American Dental Association, and the 47th annual meeting of the Fédération Dentaire Internationale, both of which were extremely successful, it is hoped that reference to happenings in Great Britain as far back as September and October will be understood.

BRITISH DENTAL JOURNAL

The British Dental Journal of September 1st was the annual educational number and for anyone interested in dental education in Great Britain the whole issue is well worth reading and helpful for reference.

The scientific section is devoted to dentistry for children and in an editorial the following passages occur:

"The interest of the profession in the dental care of children goes back at least to 1883 when, at the annual meeting of the British Dental Association held at Plymouth, it was suggested that a pamphlet entitled 'Care of the Teeth' should be made available to the public. Since that day, in every way open to it, the Association has endeavoured to obtain the co-operation of the government, local authorities, and parents in stemming the relentless tide of dental ill health in children.

"On all sides we are reminded that our children are the nation's future citizens and that we pay our debt to our ancestors by devoting an appropriate part of our resources to the welfare of the young. Government, both central and local, has therefore designated them a 'priority' class, but everyone knows by now that this is only a meaningless phrase, suggestive of interest but devoid of implementation. There is no excuse for this neglect and no reason except indifference in high places, but can we say that our present dental educational system is doing all it should to promote knowledge and interest in children's dentistry?

"It has been evident for a long time that there is a growing need for special consideration to be given in dental schools to all aspects of dental disease in children; aetiological, preventive and 'curative.'

"These facts are well-known, but investigation is still needed into the means to achieve dental health in the young, and both instructional and examining bodies could do more to educate the dental student in the care of the child. What is required is that there should be teachers whose lives are given to a study of the incidence and the effects (both immediate and long-term) of dental disease in children, to the measures by which the incidence may at least be substantially reduced, and to improved methods of treatment.

"Children's dentistry has sufficient unsolved technical problems to keep a host of enthusiasts busy for a long time, and there already exists sufficient knowledge to justify a special course during training and a separate paper in the final examination. In addition, it might well form the material for a postgraduate diploma.

"If, as is commonly believed, the really effective way of combating dental disease is to begin with the child, then the dental schools must put children's dentistry on the plane it requires so that research and training shall be given to it; for only then will lay authorities regard it in a proper light."

There are also three original contributions "Undergraduate training in children's Dentistry" by G. E. M. Hallett, "Postgraduate

training in children's dentistry" by R. Stephens, and "Dentistry for children" by G. L. Slack.

The educational supplement gives details of undergraduate and postgraduate training and is a valuable section for reference.

The Journal is also publishing a series of articles concerned with the dangers of radiation in dental practice and methods of avoiding them, contributed by B. Cohen and R. W. Stanford. This would appear to be a most valuable contribution to the dental profession on this subject.

In the October issues of *The British Dental Journal*, R. I. H. Whitlock has written an account of his impressions of a visit to Moscow. His paper is both informative and interesting and is the result of a ten-day visit made in September 1958 as part of a World Health Organization travelling fellowship, awarded for the purpose of studying oral and maxillofacial surgery in six centers in Europe.

It is interesting to note that although permission had been obtained from the U.S.S.R. for the visit, no details or arrangements for the visit could be obtained by Dr. Whitlock until his actual arrival in Moscow.

The paper covers general experiences, education, operative procedures, research projects, stomatological interests and the training and organization of stomatologists.

DENTAL TECHNICIANS

The National Joint Council for the Craft of Dental Technicians have introduced a national scheme of voluntary registration for the craft. The Register will be on a national basis and will come into operation on January 1, 1960.

The Register is established for the following purposes:

1. To record the names of dental technicians and apprentice dental technicians who satisfy the conditions attaching to registration.
2. To encourage the employment of suitably qualified dental technicians and to prevent the exploitation of the craft of dental technicians by untrained persons.
3. To assist in making information available regarding the numbers employed and the likely recruitment needs of the craft from time to time.
4. To make available to the dental profession, regional hospital boards, boards of governors of teaching hospitals, local health authorities, local education authorities, hospital management committees and boards of management and others, for employment purposes, and on request, the names of technicians included in the Register.

PARLIAMENT

The substantial majority gained by the Conservative Party over the Labour Party in the recent general election gives a good deal of point to the editorial in the September 15 issue of *The British Dental Journal* in which the following passages occur:

"It was the Labour Party which established the Health Service and whatever faults that Service may have, no one in this country would deny that it has been of tremendous benefit to the health of the people of this country. It is also of great value to the rest of the world because so far as can be ascertained no other country has produced a service with an equal range of treatment for such a large proportion of the population, and it therefore provides an example from which other nations will learn and upon which the health services they may in time establish will undoubtedly be based.

"The Association does not enter into party politics and has no particular affection for either party, for each of them has made the provision of dental treatment a political pawn.

"The two most striking features of the dental policy put forward by the Labour Party were, first the apparent failure to appreciate the magnitude of the crisis that is so rapidly approaching in the national dental service together with the necessity of taking the most urgent and energetic measures to meet it; and secondly, the apparent willingness to jettison long-professed ideals of dental priorities in favour of party ideology."

ITEMS OF INTEREST

The many friends both national and international of the following colleagues will wish to congratulate them on their recent appointments:

Sir Wilfred Fish has been appointed Honorary Consultant in Dental Surgery to the Army.

J. C. Shiach has been appointed honorary surgeon dentist to Her Majesty The Queen in Scotland.

Ralph Cocker is to be Professor of Dental Surgery and K. P. Liddelow, Professor of Dental Prosthetics, both at Kings College Hospital Dental School, University of London.

Friends of Dr. Sheldon Friel will be delighted to hear that he is to be honored by receiving one of the two Ketcham Awards in Orthodontics in Washington, D.C. on April 24, 1960.

Secretary, British Dental Association, J. N. Peacock, a graduate of Manchester University Dental School, 1928, assumed his office as

secretary of the Association on September 14, and was welcomed by Council to his first meeting with them on September 26. It will be the wish of his many friends and colleagues the world over for Jack Peacock to have many happy and successful years in this post of great responsibility and importance to the Association.

Royal College of Surgeons of Edinburgh. At a recent Statutory Meeting of the College it was moved by the President on behalf of the Council, and carried unanimously, that the Honorary Fellowship in Dental Surgery be conferred upon Lilian Lindsay who was a student at the Edinburgh Dental Hospital and School from 1892 to 1895. She was the first woman to qualify in dental surgery in Great Britain, and the first woman to be president of the British Dental Association.

General Dental Council. Mr. C. F. Thomas, a member of the Council of the British Dental Association, is to be congratulated on his recent election to the General Dental Council.

The Anglo Continental Dental Society devoted the whole of its autumn meeting at the end of October to a symposium on the child patient. The aspects covered were the dental education of parent and child, cavity preparation, and preventive orthodontics.

The American Dental Society of London held its first monthly meeting of the 1959-60 winter session with a dinner and a very interesting paper by W. G. Cross on "Bone Implants in Periodontal Disease." It is at these meetings that we are always delighted to welcome the Dental Officers of the United States Armed Forces stationed here in Great Britain who have the privilege of temporary membership.

The British Society of Periodontology held its annual meeting in October when Bryan Wade was installed as the new president and gave a most interesting presidential address.

This being for the December issue the writer sends good wishes for Christmas and the New Year.

G. H. Leatherman
D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Brazil

The seventh annual convention of the Brazilian Dental Association was held July 19-25 in the city of Pôrto Alegre, capital of Rio Grande do Sul, the southernmost state. The meeting was attended by the surprisingly large number of 1,400 participants. The opening session, at which the Governor of the state spoke, was presided over by Edmundo Nejm, retiring president of the association.

Three major areas of interest were explored in the scientific sessions. Periodontal trauma was discussed by J. Policiano Leite Neto, Jorge Romanelli and Fermin Carranza; lectures on ethics were given by Raymundo Rodrigues, Celestino de Moura Prunes and Álvaro de Melo Dória, and the essayists on preventive dentistry were Mário Chaves, Alfredo Reis Viegas, Paulo de Oliveira Chaves and Paulo Freire.

Other scientific activities included the first meeting of the Professors of Buccofacial Prosthodontics, as well as practical demonstrations, short conferences and table clinics. Public health dentistry was emphasized by means of demonstrations and essays about fluorine by authorities in this field such as Jorge Erausquin of Argentina, Norman F. Gerrie of the United States Public Health Service, Vernon Forney, also of the U. S. Public Health Service, and Mário Chaves of Brazil.

An extensive social program included regional music and dance programs, dinners, and excursions to neighboring places of interest. The convention closed with a dinner dance.

The newly-elected officers of the Brazilian Dental Association are: president, Alfredo Reis Viegas, São Paulo; vice-presidents, Evandro Rabelo de Castro, Rio de Janeiro, Nicolau Fonseca Milano, Rio Grande do Sul, and Odilon Amorim Garcia, Rio Grande do Norte; secretary-general, Marcelo Augusto Galante, São Paulo; first secretary, José Hildebrando Todescan, São Paulo; second-secretary, Paulo Zouain, Rio de Janeiro; treasurer-general, Reginaldo Frazatto, São Paulo; first treasurer, Germano Tabacos, Bahía, and second treasurer, Ataliba Moreira, Paraná. Their terms expire in 1961.

The next Brazilian National Dental Congress will be held in Curitiba, State of Paraná, in 1962, but in 1961 a big dental convention will take place in São Paulo to commemorate the fiftieth year of the São Paulo State Dental Association. The Rio de Janeiro Dental Association also is planning a large meeting for the year 1964.

Hans Freudenthal, C.D.

news of dentistry

Dentistry to take active part in nationwide science fair program for second year

Instruction kits designed to help dental societies take a more active role in the science fair movement are being sent to all constituent and component societies of the Association.

This will be the second time dentistry has taken an active part in the nationwide program. The success of local societies' efforts in this year's program resulted in House of Delegates approval at the Centennial Session of stepped-up participation next year. As the House pointed out in its resolution:

> The high school science fair movement provides a ready mechanism, on the national, state and local community levels, for developing wider public awareness of the scientific aspects of dentistry.
>
> The movement offers a direct means for attracting many highly qualified individuals into careers in dental practice, education and research.

Four awards in dental science again will be presented by the Association in 1960. The two top winners will receive an expense-paid trip to the 101st annual session October 17-20 in Los Angeles. Winners of the two second-place awards will receive $50 certificates toward the purchase of scientific equipment or books of their choice.

This will be the eleventh annual fair, held in a different section of the United States each year. The 1959 event was held May 6-9 in Hartford, Conn. This year's dental science winners, Sheila M. Most of Gulfport, Fla., and Mary Sue Wilson of Cedar Falls, Iowa, displayed their exhibits to thousands of dentists attending the Centennial Session.

The following is a brief explanation of the science fair movement:

Each year thousands of young Americans interested in things scientific enter projects in local affairs. Winners of the local events compete at regional, state and area fairs. Top winners compete in the national event. The 1960 national fair will be held May 11-14 in Indianapolis.

The instruction kit being mailed to dental societies is a how-to-do-it kit. It contains material describing the importance of participating and how to go about it. It gives step-by-step procedures for a society's work in this growing movement. It contains the information neces-

sary for a society to initiate a science fair if one isn't already planned for the community. The kit includes the booklet "Dental Projects for High School Science Students." It was produced under a grant from the Oral B Company, San Jose, Calif. About 36,000 copies of it have been distributed since January, including a second reprinting made possible through a second grant from the Oral B Company. The booklet lists specific scientific projects students can undertake and tells how dentists can assist in their endeavors.

The kit also outlines suggestions for special events a society can plan in order to publicize dental participation. One such event might be a dental science night for high school pupils and teachers. On such an evening, the society might set up table clinics, have a speaker from a nearby dental school or research center, and show the film, "Pattern of a Profession," that tells the story of the dental profession.

One of the most important aspects of the movement is the recruitment possibilities it offers. Often it is admiration of some older person that helps dictate a young person's choice of career. With the possibility that many of these youthful entrants are apt to choose some branch of science, it becomes all the more important that dentists be in a position to exert as much influence as possible in this choice.

The fairs offer a unique opportunity for dentists to describe the latest scientific advancements in dentistry. For many youngsters and their teachers it may be the first time they have had contact with a dentist outside the professional atmosphere of the dental office.

Work in fairs also brings dentists in contact with other civic-minded persons and groups, making it a natural public information and public relations project. A list of affiliated groups in the movement included in the kit illustrates that news media are interested and in many areas even act as sponsors of the fairs.

JESERICH INVITES N.A.D.L. TO CONFER ON RECOGNITION

At the annual meeting of the National Association of Dental Laboratories held in October at Miami Beach, Paul H. Jeserich, president of the American Dental Association, invited the NADL to confer with the appropriate agencies of the ADA on the development of a dental laboratory recognition program at the state or national level and to discuss the respective interests of both associations in such a program.

The first such meeting is tentatively planned for early in April. The NADL House of Delegates unanimously accepted the invitation and withdrew a number of resolutions that pertained to an NADL study of a program of laboratory recognition.

In his speech before the NADL, Dr. Jeserich further pointed to the splendid progress achieved in the joint ADA-NADL program of certification and education, and stressed the value of the two groups working together to achieve mutual objectives, rather than risk serious errors which might arise from the two organizations pursuing separate approaches to the problems.

American Dental Association guests at the NADL meeting in addition to Dr. Jeserich were Harvey Huxtable, chairman of the Council on Dental Education; Walter Dundon, past vice-president, former chairman of the Council on Dental Trade and Laboratory Relations and currently a member of the Council on Dental Education; Shailer Peterson, secretary of the Council on Dental Education, and Mr. Bernard J. Beazley, secretary of the Council on Dental Trade and Laboratory Relations.

In other actions by the NADL House, a resolution was adopted which duplicates one passed by the ADA House of Delegates at the Centennial Session: namely, that the efforts of untrained and unqualified persons to gain a limited or an unqualified right to serve the public

directly in the field of dental practice be opposed as detrimental to the health, safety and welfare of the public.

The NADL House also expressed its deep appreciation to the ADA for the 1958-59 Survey of the Dental Laboratory Industry.

Mr. Ugo Garganese, Warwick, R. I., was elected president. Other new officers are Mr. Hoyt E. Cushman, Los Angeles, vice-president, Mr. Ralph Sanders, Detroit, secretary, and Mr. Max Schoenfeld, St. Louis, treasurer.

THREE PICKED FOR WHITE HOUSE CONFERENCE ON YOUTH

Harold Hillenbrand, Association secretary, has appointed three persons to represent the Association at the White House Conference on Children and Youth March 27-April 2. They are Charles H. Patton, president-elect, C. Willard Camalier, assistant secretary, and Mr. Perry Sandell, director of the Bureau of Dental Health Education.

These conferences are held every ten years for the purpose of promoting opportunities for children and youth to realize their full potential for a creative life in freedom and dignity.

The American Dental Association is one of many hundreds of organizations taking part in the conference. State and component societies are working at the state and local levels to plan programs of action which will further the success of the White House Conference.

Mr. Sandell attended a meeting in Washington, D. C., in September of the Council of National Organizations for Children and Youth which is responsible for program planning for the White House Conference.

ASSOCIATION STILL CONFERS WITH JUSTICE DEPARTMENT

Representatives of the American Dental Association are continuing to meet with the Justice Department in Washington, D. C., in an effort to determine the precise details of the government's interest in the dental laboratory accreditation program. The information gained in these conferences will be reported to the officers of constituent societies.

Senator James E. Murray (D., Mont.) was awarded a souvenir stamp album with the dental health stamps commemorating the Centennial of the American Dental Association. Here outgoing president of the Association, Percy T. Phillips, is shown making the presentation at one of the meetings of the Centennial Session in New York.

COUNCIL ON RELIEF REPORTS FUND NEARS HALFWAY MARK

Nearly half of the total of $100,000 sought for the American Dental Association Relief Fund for 1959-60 had been contributed by the end of October, the Council on Relief reported. The figure now stands at $47,951.91.

This year's campaign has attracted approximately 1,500 more donors than it had on the same date last year and contributions are running about $10,000 ahead of last year's drive.

Three constituent societies have already met or exceeded their quotas—Alaska, Arizona and Nevada.

GEORGE FITZ APPOINTED TO COUNCIL ON DENTAL TRADE

Paul Jeserich, Association president, has appointed George H. Fitz, Pontiac, Ill., to membership on the Council on Dental Trade and Laboratory Relations to succeed R. J. Pollock, resigned.

The appointment is for the ad interim term which will end with the annual session in 1960, at which time the House of Delegates will elect a person for the balance of the term ending in 1961.

International

BRITISH DENTAL ASSOCIATION RECEIVES COPY OF 'HISTORY'

The British Dental Association, through its secretary, J. N. Peacock, has written to Harold Hillenbrand, secretary of the American Dental Association, on receipt of a presentation copy of "The History of the American Dental Association." The letter reads, in part:

"In accepting this handsomely produced volume, Council directed me to convey to you their most grateful thanks for the gift. Not only does this still further cement the bonds which link our two Associations, but it will be a source of inspiration and encouragement to all who read it in our Library, where it is now deposited."

FIRST PAN-AMERICAN MEETING ON PEDODONTICS AT BOGOTA

The first Pan-American Congress on Pedodontics will be held February 21-27 in conjunction with the third reunion of the Pan-American Council of Dentistry for Children, in Bogotá, Colombia. The meetings are being organized by the Colombian Society of Pedodontics.

The society is interested in obtaining exhibits and films on dentistry for children, preventive orthodontics, children's public health problems, treatment of handicapped children, and cleft lip and palate treatment.

Dentists wishing to attend, to participate, or to send exhibits or films are asked to wire the society's president, Benjamin Gomez, Carrera 13 No. 41-58, Apartado Aereo 7013, Bogotá, Colombia.

AMERICAN DENTAL CLUB OF PARIS REQUESTS SPEAKERS

Dentists from the United States who would like to serve as essayists or present table clinics at the meetings of the American Dental Club of Paris, France, are asked to write to Yves A. Cantin, president of the club.

The group meets on the first Thursday of each month from October through June and is composed largely of dentists who have studied in American schools. All meetings are conducted in English.

Dr. Cantin's address is: 33, Rue de la Bienfaisance, Paris 8, France.

NEW TYPE OF DENTAL PUBLIC HEALTH COURSE IN BRAZIL

Latin American dentists interested in public health will have in 1960 a choice of two courses at the University of São Paulo—a specialization course and an orientation course.

The specialization course, equivalent to the Master of Public Health program in the United States, will take 11 months, beginning February 15. It was offered for the first time in 1958 and already has been taken by dentists from 13 different countries.

The orientation course, which will be given for the first time in 1960, represents a new approach in teaching public health dentistry. Its aim is to prepare dentists for

work at the community level in integrated health services. The course runs for nine weeks starting May 2, and includes one week of field activities in a community health program.

The World Health Organization, the W. K. Kellogg Foundation and the Brazilian Special Public Health Service provide assistance to this training program. Additional information can be obtained from the School of Public Health, University of São Paulo, Caixa Postal 8099, São Paulo, Brazil.

NOW IT IS SWISS SOCIETY OF ODONTOSTOMATOLOGY

The Swiss Odontological Society, at its recent 74th general assembly, by unanimous vote approved a proposal to change the name of the organization to Swiss Society of Odontostomatology.

"This denomination expresses adequately the scope of education, activity and competence of the Swiss practitioner of dentistry certified by the federal board," stated L. J. Baume, society president.

EARLY BOOKINGS URGED FOR F.D.I. SESSION IN DUBLIN

Organization of the scientific program of the 48th annual session of the Fédération Dentaire Internationale in Dublin, Ireland, June 20-25, is now under way. Dentists from the United States who may wish to participate or attend may contact Obed Moen, FDI president and national treasurer for the FDI for the United States.

Enrollment forms for the meeting can be obtained from Dr. Moen or directly from the Irish Dental Association, 23

Paul H. Jeserich, Association president, was elected to a Fellowship in Dental Surgery by the Royal College of Surgeons at the celebration of the centennial issuance of the Royal Charter of 1859 in London last summer. Photographed at the ceremony were (l. to r.) Professor R. Bradlaw, director of Eastman Dental Institute, London; Scott Hamilton, Canada, and Don Gullett, secretary of the Canadian Dental Association, both also elected to Fellowships; Dr. Jeserich, and Sir James Patterson Ross, president of the Royal College of Surgeons.

Harcourt Street, Dublin. The American Express Company, Inc., and Thos. Cook and Son are acting as joint travel agents for the meeting.

Although up to 1,000 hotel beds have been secured in Dublin for the meeting, early booking is necessary as the end of June is the busy tourist season in Ireland. Accommodation cannot be guaranteed to those booking after March 1.

Day tours radiating from the city embrace some of the most beautiful parts of Ireland, including Killarney. Presession and postsession tours will be available to those anxious to see more of the country.

Dr. Moen's address is 6 Main St., Watertown, Wis.

ARGENTINE DENTAL GROUP NAMES NEW OFFICERS

The Institucion de Protesis Clinica of Buenos Aires, Argentina, has announced the following recently elected board of directors:

President, Natalio G. Pavese; first vice-president, Italo Malisani; second vice-president, Luis E. Tamini; secretary, Deoclesio Quevedo; assistant secretary, Alberto Santesteban; recording secretary, Guillermo Buljevich; treasurer, Carlos Lucio Somoza, and assistant treasurer, Luis Alberto Tamini.

THREE BRAZILIAN CITIES FLUORIDATE PUBLIC WATER

Fluoridation of public water supplies in three Brazilian cities has already been accomplished by the Commission on Water Fluoridation which was formed a year ago. The commission is an integral part of the Government of the State of Rio Grande do Sul. It is composed of representatives from the Ministry of Public Works, one chemist and one engineer, and representatives from the Ministry of Health, one dentist and one public health physician.

The program calls for fluoridation installations which will benefit the inhabitants of 30 cities of the state. The cities

A new history of the Norwegian Dental Association was presented to Norway's King Olav the Fifth on the occasion of the General Meeting of the seventy-fifth anniversary of the Association at City Hall, Oslo, in October. Knut Gard, left, is secretary of the association, and Sigurd Vik, right, president. Harold Hillenbrand, secretary of the ADA, spoke to the association at this event, and presented a commemorative plaque from the American Dental Association.

Obed H. Moen, Watertown, Wis., left, was installed as president of the Fédération Dentaire Internationale at the final meeting of the FDI in its 47th annual session in New York. T. Brandrup-Woqnsen, Sweden, outgoing president, is seen placing the president's medallion around Dr. Moen's neck. At right is Hans Freihofer, Switzerland, speaker of the FDI General Assembly.

where installations are now functioning are Taquara, Guaiba and Montenegro.

PERU DENTAL SOCIETY LISTS NEW BOARD OF DIRECTORS

The Sociedad Peruana De Protesis Dental of Lima, Peru, has announced the following new board of directors for 1959-60:

President, Oscar García Barrantes; vice-president, Genara Acosta Herrera; secretary, Alfonso Quirós Valverde; treasurer, Humberto Berger, and librarian, Victor Málaga Muñoz.

Felipe L. Plaza is director of the society's journal, and Ricardo Salazar S. is director of the "dental letter."

COLOMBIA DENTAL SOCIETY NAMES NEW OFFICERS

The Sociedad Odontológica Antioquena of Colombia, South America, has elected the following officers for 1959-1960:

President, Guillermo Londoño M.; vice-president, Jaime Naranjo L.; secretary, Arturo González Ch. (reelected); treasurer, Jesús Billegas B., and board members, Dario Restrepo G. and Bernardo Angel M.

GUATEMALA DENTAL SOCIETY ELECTS NEW OFFICERS

Eduardo Garcia Salas has been named president for 1959-60 of the Sociedad Dental de Guatemala. Other new officers are:

Vice-president, Guillermo Zachrisson A.; secretary, Julio Molina Galvez; treasurer, Enrique Peralta; assistant secretary, Donald Byrne M., and librarian, Arturo Zepeda A.

Public Health

DENTAL HEALTH SECTION OF A.P.H.S. ELECTS OFFICERS

The Dental Health Section of the American Public Health Association, during its annual meeting at Atlantic City in October, elected the following:

Chairman, Carl L. Sebelius, Nashville, Tenn.; vice-chairman, Wesley O. Young, Boise, Idaho; secretary, David F. Striffler, Santa Fe, N. M.; section councilors, one year term, Quentin M. Smith, Washington, D. C., and Albert Trithart, Helena, Mont.; two year term, Philip E. Blackerby, Jr., Battle Creek, Mich., and Viron

L. Diefenbach, Denver, Colo.; three year term, Donald J. Galagan and Miss Elizabeth Warner, both of Washington, D. C.

The Governing Council of the American Public Health Association, which previously had passed resolutions simply endorsing fluoridation as safe and effective, at this meeting passed a new resolution *urging* that the association "vigorously support and recommend the adjustment of the fluoride content of water supplies as a progressive health measure . . . and urge all health authorities to give high priority to public education on water fluoridation . . . and call upon all health agencies and professional and civic groups to intensify their efforts towards this end."

The Governing Council also elected the following to Fellowship in the American Public Health Association in affiliation with the Dental Health Section: J. E. deWever, Jersey City, N. J.; James M. Dunning, Cambridge, Mass.; Joel Freedman, New York, N. Y.; and F. Earle Lyman, Bethesda, Md.

FLUORIDATION ACTION IN THREE COMMUNITIES

Lancaster, Pa., has announced the decision of the City Council to fluoridate the city's drinking water supply. Lancaster is the home of George J. Brett, a dentist who is an outspoken antifluoridationist.

Attempts to end the water fluoridation program in Richmond, Va., recently failed in City Council by a 4-4 vote. The vote was on an ordinance to suspend the seven year old program. Whenever such a deadlock occurs, the ordinance is considered rejected.

The United States Supreme Court has ruled that fluoridation of the water supply of the town of Fircrest, a suburb of Tacoma, Wash., is legal. Suit had been brought by Mrs. Patricia I. Birnel who appealed a local judge's dismissal of her complaint that she and her children were being compelled against their will to consume a substance designed to affect their bodies. The population of Fircrest is about 3,000. It has had fluoridation for nearly two years.

DENTAL PUBLIC HEALTH BOARD CERTIFIES 4 NEW DIPLOMATES

Four persons have been certified as Diplomates by the American Board of Dental Public Health as a result of the certifying examination given at the College of Dentistry, New York University, September 10 and 11. They are: John M. Frankel, E. B. Gernert, Lloyd F. Richards and William D. Wellock.

The board will hold its next certifying examination October 13 and 14, 1960, in Los Angeles, just prior to the annual meeting of the American Dental Association. Candidates must submit their applications to the secretary of the board not later than June 15. Information and application forms can be obtained from the secretary whose address is: Division of Dental Public Health, Public Health Service, Department of Health Education, and Welfare, Washington, D. C.

Officers and a new member of the board elected at the New York meeting are: president, Robert A. Downs; vice-president and auditor, Chester V. Tossy; secretary-treasurer, Donald J. Galagan, and member (to succeed Philip E. Blackerby, Jr.), Arthur Bushel.

DATE OF CHILD HEALTH DAY CHANGED TO OCTOBER

For the first time since its initiation in 1928, Child Health Day will be observed beginning next year on a new anniversary date, the first Monday in October.

The change was approved in September by President Eisenhower when he signed a joint Congressional resolution moving the observance from its traditional date of May 1.

The new date will permit the United States to link its Child Health Day observance more closely to Universal Children's Day, which many nations observe on the October date.

DENTAL RESEARCH FACILITIES AIDED BY P.H.S. GRANTS

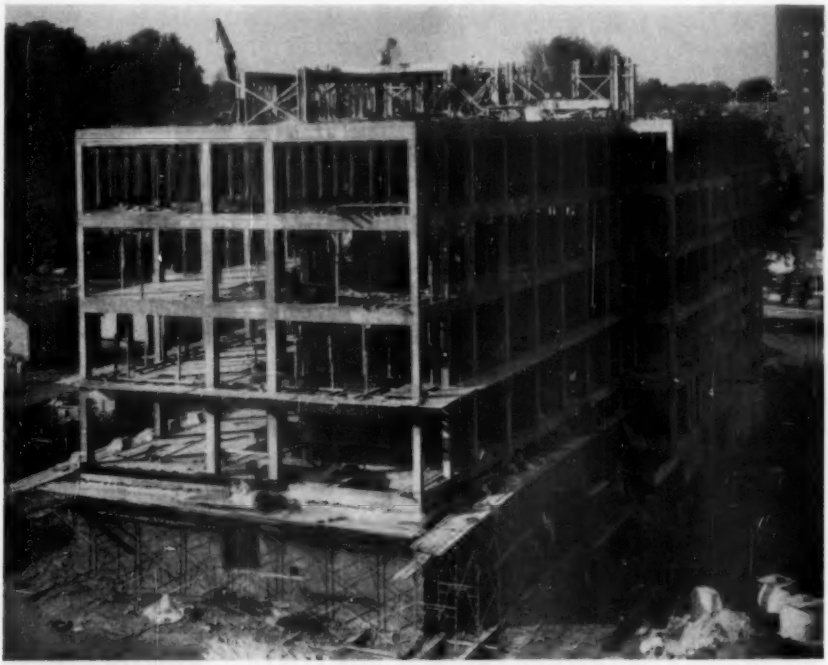
Surgeon General Leroy E. Burney, U. S. Public Health Service, has announced the awarding of three grants during the month of October to help build and equip dental research facilities.

The University of Kentucky, Lexington, received $599,477 for a dental science research building. New York University College of Dentistry was given $69,800 for basic science research laboratories and equipment for the College of Dentistry. The Eastman Dental Dispensary, Rochester, N. Y., was awarded $5,786 for the remodeling of dental research facilities.

FIGURES ON FLUORIDATION IN THIS COUNTRY TOLD BY P.H.S.

A report on the status of fluoridation in the United States as of November 1 has been sent out by the Division of Dental Public Health, United States Public Health Service.

The report states that 1,850 com-



The new National Institute of Dental Research building was about 22 per cent completed on November 1. The $3,700,000 structure is the result of a decade-long drive on the part of dental, lay and public leaders for modern facilities to house all dental research laboratories at the National Institutes of Health. The building will accommodate some 200 scientific and technical personnel now engaged in broad spectrum research on oral and related diseases.

munities having 1,022 water supply systems are fluoridated. These serve a population of 36,138,430.

Norman F. Gerrie is the chief of the Division of Dental Public Health.

Dental Education

DENTAL DEANS HOLD FIRST WORKSHOP CONFERENCE

The first conference on dental school administration, held November 6-8 in Phoenix, Ariz., was so successful it is planned to make the program an annual affair. The conference, sponsored by the American Association of Dental Schools, was attended by the deans of 40 of the 47 dental schools in the country.

Lester W. Burket, vice-president of the American Association of Dental Schools, and dean of the University of Pennsylvania School of Dentistry, presided. He was also chairman of the conference planning committee. The welcoming address was given by Robert W. McNulty, AADS president and dean of the University of Southern California School of Dentistry.

The keynote address of the conference was delivered by Herbert E. Longenecker, vice-president of Chicago Professional Colleges, University of Illinois, who spoke on the human element in administration.

The conference was programed on a workshop basis, with three major areas of discussion: administrative problems; operational problems, and public relations and student recruitment.

The workshops resulted in several recommendations being made by the group. In connection with dental school faculties, it was recommended that a study be made of the supply and projected needs for personnel, and of the definitions and function of part-time and full-time teachers.

Finance and budgeting were discussed in the workshop on operational policies, and a need was expressed for a pattern of uniform financial reporting on the part of both state and private schools. The AADS plans to begin such a study in the near future.

One session of the conference emphasized the need for a strong affiliation between dental education and the dentistry departments of hospitals, recognizing the concern on the part of dental educators over hospital dental services and their importance in the complete education of the dental student.

The Bain report on the country's future health manpower source, recently issued by the United States Public Health Service, prompted a listing of additional areas in which dental educators can attempt to solve the problem of a dentist shortage. It was agreed that educators must be more concerned with the most productive use of auxiliary personnel and the education of the student in this use. The importance of devoting more attention to clinical design and time and motion studies was emphasized, as well as to further teaching in the use of high-speed equipment.

The conference participants developed a number of suggestions related to an expanded program of recruitment of highly qualified students to fill existing places in the freshman classes as well as the anticipated needs of the future.

COURSE ON PATHOLOGY OF THE ORAL REGIONS, MARCH 14-18

The dental and oral pathology division of the Armed Forces Institute of Pathology, Washington, D. C., announces its annual course entitled "Pathology of the Oral Regions" will be presented March 14-18 at the Institute.

The substance of the course will be directed at the biologic aspects of general dental practice. Attendance is limited to 100 and as registration is usually heavy it is suggested that applications be made

At the first conference on dental school education held last month in Phoenix, Ariz., are seen (l. to r.): Raymond J. Nagle, president-elect of the American Association of Dental Schools, sponsoring agency, and dean, New York University, College of Dentistry; Robert W. McNulty, president of AADS, dean, University of Southern California School of Dentistry; Paul H. Jeserich, president of the American Dental Association, dean, University of Michigan School of Dentistry, and Lester W. Burket, vice-president of AADS and chairman of the conference planning committee, dean, University of Pennsylvania School of Dentistry.

immediately. Members of the military establishments can apply in accordance with Circular No. 621-31, Department of the Army, dated 10 June 1959.

ILLINOIS PLANS SEMINAR ON DENTAL TEACHING PRINCIPLES

The University of Illinois College of Dentistry will sponsor a three-day seminar on the principles of dental teaching to begin February 1. Presented in cooperation with the Kellogg Foundation, the seminar is for dentists who are engaged in private practice and who have an interest in methods and principles of dental teaching.

The purpose is to stimulate interest among practitioners toward the possibility of future activity in dental education and to increase their awareness of the need for additional effective teachers in dentistry. There is no tuition fee but there is a registration fee of $10.

Additional information can be obtained from Edward J. Forrest, associate dean, College of Dentistry, University of Illinois, 808 S. Wood St., Chicago 12.

ONE-, TWO- AND THREE-YEAR PROGRAMS AT FORSYTH

One-year fellowships in dental medicine are offered at Forsyth Dental Infirmary for Children at Boston. Similar appointments in the biological sciences are offered to persons with training in dentistry or in the appropriate biological sciences.

A two-year fellowship in orthodontics is offered to qualified applicants who wish to specialize in this field. Further information on these programs can be obtained by writing to the director of the infirmary at 140 The Fenway, Boston 15.

A relatively new three-year postdoctoral training program is intended to prepare dental graduates for careers as clinical teachers. This program, administered by the Harvard School of Dental Medicine, in collaboration with Forsyth and affiliated hospitals, is offered to persons selected on the basis of outstanding academic record and promise. Additional information on this three-year program can be obtained from Reidar F. Sognnaes, Harvard School of Dental Medicine, 188 Longwood Ave., Boston 15.

CROWN AND BRIDGE TEACHING FELLOWSHIPS AT EMORY

The Emory University School of Dentistry is offering 24-month teaching fellowships in crown and bridge dentistry, according to George H. Moulton, who is in charge of the program.

The crown and bridge course is a postgraduate program, designed to qualify

participants to practice crown and bridge dentistry as a specialty. A certificate is issued on satisfactory completion.

Recipients of the fellowships receive an annual stipend of $1,200. Appointments are made each year to begin on August 1 for the succeeding 24-month period.

TUFTS OFFERS FELLOWSHIPS IN PATHOLOGY, PERIODONTICS

Two fellowships intended for graduate dentists interested in research and teaching careers in oral pathology and periodontics are available at Tufts University School of Dental Medicine. The programs begin in September 1960.

In addition to participation in an extensive research program, the fellowships offer training in oral pathology in a laboratory with an active biopsy diagnostic service, and an opportunity for preparing for advanced degrees. There is an annual stipend of $5,000 and the fellowships are renewable.

Additional information and application forms can be obtained from Dr. Irving Glickman, Department of Oral Pathology and Periodontics, 136 Harrison Ave., Boston 11.

SCHOOLS LIST REFRESHER, POSTGRADUATE COURSES

Alabama • The University of Alabama School of Dentistry will present three refresher courses during the month of February. On February 6 and 7, John F. Prichard will present a program in the management of advanced periodontal disease; February 13-15, Samuel Gore will present a course in removable orthodontic appliance construction which is limited to practicing orthodontists, and February 27-29, Daniel J. Holland will offer a course in practical exodontics.

Further information can be obtained from the Director, Refresher Course Program, University of Alabama School of Dentistry, 1919 Seventh Ave. S., Birmingham 3.

California • The School of Dentistry of the University of California, San Francisco Medical Center, is offering the following courses: Dental therapeutics and prescribing, January 8 and 9, Sol Silverman, Jr., and staff; interpretation of dental roentgenograms, January 15 and 16, Gordon M. Fitzgerald and Theodore S. Grant; complete denture construction, January 20-22, Bernard Jankelson.

Emory • Two February courses and one in March are listed by Emory University School of Dentistry. Sigurd Ramfjord will conduct a course in occlusal adjustment February 1-5; Viken Sassouni will teach roentgenographic cephalometry in orthodontics February 18-20, and Edwin D. Hibbard will conduct a course in pedodontics March 2-4.

Complete details can be obtained by writing to Dr. Ernest L. Banks, Director of Postgraduate Education, Emory University School of Dentistry, 106 Forrest Ave. N. E., Atlanta 3, Ga.

Indiana • A four-day symposium on crown and bridge construction will be held April 11-14 at the Indiana University School of Dentistry. This will be conducted by school staff members. In connection with this course, a full-day symposium will be held April 13 in Rice Auditorium, Indiana State Board of Health Building, Indianapolis, on porcelain jackets and porcelain veneered gold crowns. Guest lecturers will be George Moulton and Mr. John Pettrow, ceramist.

Loyola • A postgraduate course in cephalometrics for treatment planning and case analyais will be offered by Loyola University School of Dentistry (Chicago) January 20-23. Cecil Steiner, director of the course, will describe the evolution of the Steiner cephalometric analysis. The class will be directed in the mechanics of tracing head roentgenograms and each student will be assigned 15 practical cases for analysis. The course is limited to 20 persons in the practice of orthodontics. The cephalometric aspect of the course also is open to pedodontists and interested students.

Further information and application forms can be obtained by writing to the Director, Postgraduate Division, Loyola University School of Dentistry, 1757 W. Harrison St., Chicago 12.

Michigan • The W. K. Kellogg Foundation Institute—Graduate and Postgraduate Dentistry, University of Michigan, Ann Arbor, lists the following postgraduate courses for the January-March period:

Complete denture prosthesis, January 4-15; dental radiology, January 18-22; periodontics, January 18-29; dentistry for children, Febru-

ary 15-26; partial denture prosthesis, February 15-26; endodontics, February 29-March 11; orthodontics for the general practitioner, February 29-March 11; crown and bridge prosthesis, March 7-18; minor oral surgery, March 7-18; dental treatment for handicapped children, March 14 and 15; hydrocolloid and rubber base inlay technics, March 14-16, and higher speeds for rotating instruments, March 17 and 18.

A brochure containing detailed information is available from the office of William R. Mann, associate director of the institute.

Nebraska • A course in periodontics in the general practice of dentistry, under the direction of Richard E. Bradley will be given at the University of Nebraska College of Dentistry April 11 and 12. Guest lecturer will be Perry A. Ratcliff. Additional information can be obtained by writing to: John M. Cronland, University Extension Division, University of Nebraska, Lincoln 8.

New York • New York University College of Dentistry is offering a postgraduate course in fixed bridge construction on Friday afternoons from January 15 through May 6. The course is limited to ten students and the tuition is $325. Edward G. Kaufman will direct.

Northwestern • A course in analysis and treatment of the stomatognathic system, for the general practitioner, will be given by Northwestern University Dental School March 14 and 15. The sessions will be taught by John R. Thompson, course leader, Harold T. Perry, Glenn E. Jackson and Morton S. Rosen. Victor H. Sears will be guest lecturer. Further information can be obtained from the school at 311 E. Chicago Ave., Chicago 11.

Oregon • The following courses have been scheduled by the University of Oregon Dental School for March and April: endodontics, March 28-April 2, by Ralph F. Sommer; dentistry for children, April 10-15, by Charles A. Sweet, and full mouth reconstruction, April 18-22, by John C. Bartels.

Further information can be obtained from Vinson M. Weber, Department of Postgraduate Education, University of Oregon Dental School, 611 S. W. Campus Dr., Sam Jackson Park, Portland 1.

Pennsylvania • Postgraduate courses scheduled at the University of Pennsylvania School of Dentistry are as follows: oral diagnosis and roentgenology, January 14-18, Lester W. Burket and LeRoy M. Ennis; prosthetic relations of the temporomandibular joint, January 18-22, Ernest R. Granger; hospital dentistry, John P. Looby and associates; endodontics (continuation course), six Wednesdays starting January 6, Samuel Seltzer and I. B. Bender; periodontal prosthesis, February 8-12, Morton Amsterdam and D. Walter Cohen; partial dentures, February 29-March 4, M. M. DeVan; practice administration, March 7 and 8, Harry M. Klenda, and practical and simplified procedures in crown and bridge prosthesis, March 14-18, Charles B. Sceia.

The school is located at 4001 Spruce St., Philadelphia 4.

San Francisco • The School of Dentistry of the College of Physicians and Surgeons, 344 Fourteenth St., San Francisco, lists the following courses:

Clinical periodontics, December 14-16 and April 7-9, by Alvin C. Hileman and staff; dentistry for children, January 24-29 and June 19-24, by Charles A. Sweet and staff; tooth guidance, January 31-February 4, by I. Irwin Beechen and George N. Boone; practical partial dentures, February 8 and 9, by Edward P. Boero and John E. Rhoads; practical application of recent developments in dental materials, March 5 and 6, by George M. Hollenback and John E. Rhoads; operative dentistry under general anesthesia, March 14 and 15, by John Tocchini, Emmet Stanton and staff; complete denture prosthesis, March 11-15, by Browning O. Chartrand and staff; endodontics, May 16-18, by Bertram L. Wolfsohn and staff; oral roentgenology, for dental assistants, December 10 and 11 and April 14 and 15, by Joe G. Sweet, II, and staff, and clinical occlusion, May 23-25, by A. C. Hileman, E. P. Boero and J. P. Crampton.

Temple • A course in practice administration will be conducted by Jay H. Eshleman February 27 at Temple University School of Dentistry. Other postgraduate courses offered are: clinical diagnosis and oral medicine, February 29-March 4, by Lester W. Burket and S. Leonard Rosenthal; electronic electrosurgery, March 18 and 19, by Maurice J. Oringer, and complete denture prosthesis, March 21-26, by Bernard Jankelson and associates.

Further information can be obtained by writing to: Graduate and Postgraduate Studies, Temple University School of Dentistry, 3223 N. Broad St., Philadelphia 40.

Toronto • A two-day postgraduate course in endodontics will be presented at the Faculty of Dentistry, University of Toronto, Toronto, Canada, January 11 and 12. The course will be under the general direction of Professor

S. A. MacGregor, and emphasis will be given to a discussion of practical methods of preventing malocclusion.

Tufts • Tufts University School of Dental Medicine announces the following refresher courses: clinical dentistry for children, January 28 and 29, Bernard Rabinowitch; hypnosis and its clinical applications, March 17-23, Lawrence Staples and Milton Erickson, M.D.; complete denture implants, March 28-April 1, Norman I. Goldberg and Aaron Gershkoff; minor oral surgery, Wednesdays from March 2 through April 6, Richard Taylor and staff; advanced surgical periodontal treatment technics, April 4-6, Irving Glickman, John Prichard, Richard Taylor, Arthur Gold and Benjamin Patur; special participation course in periodontology, April 25-29, Irving Glickman and staff.

Further information can be obtained from the school's division of postgraduate studies at 136 Harrison Ave., Boston.

Washington • The University of Washington (Seattle) School of Dentistry Department of Postgraduate Dental Education will present a refresher course in dental therapeutics and prescribing January 9 and 10. The faculty includes James M. Dille, M.D., John D. Gehrig, John I. Ingle and William M. Kirby, M.D. The enrollment fee is $30 for dentists and $10 for dental hygienists.

Dental Societies

KENTUCKY SOCIETY ASKS T.V. TO DROP DECEPTIVE ADS

The Kentucky Dental Association, through its president, Lyman E. Wagers, sent strongly-worded requests to C.B.S. network president Mr. Frank Stanton and other network presidents to eliminate misleading advertisements from their broadcasts.

The communication read in part: "The exaggerated claims of the toothpastes, mouthwashes, and even chewing gums, are preposterous to those of us who have scientific knowledge of the capabilities of these products."

Dr. Wagers was quoted in the Louisville *Courier-Journal* of November 11 as saying: "There are only three scientifically valid ways to prevent tooth decay: by the exclusion of sugars and starches from the diet; by immediate toothbrushing after using solid or liquid foods, and by fluoridation of commercial water supplies."

INDIANA DISTRICT SOCIETY SPONSORS MOUTHGUARDS

Because of the interest of several Fort Wayne (Ind.) dentists and the Isaac Knapp District Dental Society, Fort Wayne is believed to be the first city of any size in the country in which all football players of the city's five high schools have been furnished with individually fitted mouthpieces.

The dental society undertook the project early in the spring of this year and by the time the schools opened in the fall all varsity and reserve squad players, except freshmen, had been fitted for the guards made of liquid latex.

The society expects to extend the project to junior high schools in Fort Wayne and its suburbs by next fall.

ASPEN, COLO., SITE OF 1960 CENTRAL DENTAL GROUP MEET

The Central Dental Association will hold its 1960 annual meeting February 14-20 at Aspen, Colorado. The association is comprised of dentists from Colorado, Minnesota, Montana, North Dakota, South Dakota, Wisconsin and Wyoming.

Further information can be obtained from the secretary, Bryce A. Gilbertson, 1132 Lowry Medical Arts Building, St. Paul, Minn.

FIRST SEMINAR ON DENTAL DRUG THERAPY HELD IN CONN.

The first postgraduate seminar on drug therapy for dentists at a college of pharmacy in this country was held October 28

At the last annual meeting of the New Mexico Dental Association in Santa Fe, J. J. Clarke, Artesia, and J. S. Eilar, Albuquerque, were presented silver bowls in honor of their many years of service to the profession. Dr. Clarke served 47 years on the New Mexico Board of Dental Examiners, for 32 of which he was secretary. Dr. Eilar is A.D.A. Trustee, Twelfth District. Shown (l. to r.) are Dr. Eilar, Paul H. Jeserich, A.D.A. president, Dr. Clarke and Alfred L. Lopez, president of the New Mexico Dental Association.

at the University of Connecticut, Storrs.

Lester W. Burket, dean, University of Pennsylvania School of Dentistry, and chairman of the Council on Dental Therapeutics of the American Dental Association, was the principal speaker.

The seminar was sponsored by the Connecticut Joint Dental-Pharmaceutical Committee, the council of postgraduate studies of the Connecticut State Dental Association, and the University of Connecticut College of Pharmacy.

General

JAMES T. GINN, 50, DIES: DEAN AT TENNESSEE UNIVERSITY

James Theda Ginn, 50, dean of the University of Tennessee College of Dentistry, died suddenly October 31.

Born in Snow Hill, N. C., Dr. Ginn joined the university faculty in 1946 as associate professor of oral medicine and surgery. He became chief of the college's division of operative dentistry in 1948 and dean of the college in 1950.

He was active as dean until his death and was working with architects on plans for the school's proposed dental-pharmacy research building.

Dr. Ginn, author of many articles on dentistry, was the editor of a book, "Review of Dentistry." He was a member of the International Association for Dental Research, the American Association for the Advancement of Science, Omicron Kappa Epsilon honorary dental fraternity, the American Dental Association, and was a fellow of the American College of Dentists.

James T. Ginn

TWO DENTAL CONFERENCES TO BE HELD AT SCIENCE MEETING

When the American Association for the Advancement of Science holds its annual meeting December 28-30 in Chicago, two principal dental conferences in the form of symposiums will be sponsored and cosponsored by the Dental Section of AAAS.

On the afternoon of December 28 a symposium on the oral aspects of aging will be moderated by Reidar F. Sognnaes, secretary, Section Nd, AAAS. This session will be cosponsored by AAAS Section N (Medicine), the Gerontology Society, the International Association of Dental Research (N. Amer. Div.), the American Dental Association and the American College of Dentists.

Speakers will include Samuel Pruzansky, Earl O. Butcher, Julius Klingsberg, John R. Ring, Albert A. Dahlberg, John Nalbandian, Dr. Sognnaes and David Weisberger.

Tuesday morning, December 29, a symposium entitled "American Dentistry at the Centennial Crossroad" will be moderated by Frank J. Orland, program chairman, Section Nd, AAAS. This conference will be cosponsored by the American Dental Association, the American Association of Dental Schools, the International Association of Dental Research (N. Amer. Div.), the American College of Dentists, and the American Academy of the History of Dentistry.

Speakers at this session will be George C. Paffenbarger, H. Trendley Dean, Robert M. Stephan, Shailer Peterson, Lon W. Morrey and Byron S. Hollinshead.

In addition to its own program, Section Nd is cosponsoring two partially overlapping AAAS meetings: one on premedical and predental education, and a symposium on aging.

TWO PROMINENT DENTISTS HONORED BY LOYOLA ALUMNI

At a Founders Day Awards convocation held Nov. 10 by Loyola University, two dentists were among the nine Loyola alumni honored by the Alumni Association for contributions to their professions. They are Robert J. Pollock, past president of the Illinois State Dental Society, and Kazuo Sato, president of the Japan Dental Association and known as the dean of dentistry in Japan.

H. TRENDLEY DEAN GIVEN THE JOHN R. CALLAHAN AWARD

H. Trendley Dean, former secretary of the Association's Council on Dental Research, was awarded the John R. Callahan Award October 26 by the Ohio State Dental Association.

Dr. Dean was director of the National Institute of Dental Research for five years prior to his joining the staff of the Association in 1953. He was given the Callahan honor for the introduction of epidemiological methods to the study of dental caries and for dental research in general.

Thomas J. Hill, chairman of the Association's Council on Dental Research and former recipient of the Callahan Award, made the presentation in ceremonies at the Statler Hilton Hotel in Cleveland.

In memory of John R. Callahan, the award has been made annually since 1922 to a person who has made a "contribution to dental science which is of very exceptional value."

Dr. Dean is retired and makes his home in Evanston, Ill.

August Pritzlaff

PRITZLAFF, FRIEND OF CHILD DENTAL HEALTH, TO RETIRE

A dinner honoring Mr. August H. Pritzlaff, director of the Bureau of Health, Physical Education, and Recreational Services, Chicago Board of Education, will be held January 11 in the Grand

Ballroom of the Conrad Hilton Hotel. For many years Mr. Pritzlaff has worked closely with the American Dental Association and the Chicago Dental Society. Throughout his professional career one of his primary interests and concerns has been the improvement of dental health in children and young people.

From 1939 through 1959 he has served as the chairman of the Joint Planning Committee for Dental Health Education, with the responsibility for planning a city-wide program of dental health education in the elementary and secondary schools. The Chicago Dental Society, Chicago Board of Health's Dental Division, Northwestern University School of Dentistry, and the Chicago Board of Education are cooperating groups in this project.

Mr. Pritzlaff "fathered" school dental clinics in Chicago in 1941 and was responsible for their operation until 1952. He chaired the committee to establish, supervise, and operate 46 of these clinics in the Chicago Public Schools.

GERIATRIC DENTISTRY GROUP TO MEET FEB. 7 IN CHICAGO

The American Society of Geriatric Dentistry will meet Sunday, February 7, at the Conrad Hilton Hotel, Chicago, during the Midwinter Meeting of the Chicago Dental Society.

Interested members of the American Dental Association are invited to contact Phillip G. Rubens, secretary-treasurer, 55 East Washington St., Chicago 2.

CHICAGO RESEARCH ACADEMY SCHEDULES OPEN SEMINAR

Occlusion concepts and periodontal prosthesis are the two subjects of the annual seminar of the Chicago Academy of Dental Research which will be held February 6 and 7 at the Conrad Hilton Hotel, Chicago. This will be the tenth such seminar of the group and will be opened this year to all interested dentists because of the great interest shown in previous meetings.

Lewis Fox of Columbia University will be the moderator. Clinicians will be Ernest Granger of the University of Pennsylvania, John Lucca of Columbia University, and Robert Moyers, University of Michigan.

Further information can be obtained from W. G. Gordon, director of seminars, Chicago Academy of Dental Research, 111 N. Wabash St., Chicago 11.

CENTENNIAL SESSION BRINGS HOST OF VISITORS TO N.B.S.

Many professional people from overseas who were in this country to attend the Centennial Session of the American Dental Association and the annual meeting of the Fédération Dentaire Internationale have visited the National Bureau of Standards in Washington, D. C. Most of them were interested in inspecting dental materials.

Among those who registered at the bureau during the summer and fall were: Kristian Georg Sorensen, São Paulo, Brazil, a chemist with a Brazilian dental manufacturer; Trinah Van Tuat, director of the dental school of the University of Saigon, Vietnam; Chun Gun Rhee and Ju Whan Kim, professors of the College of Dentistry, Seoul, Korea; Guilherme S. Gomes, professor at the School of Dentistry, São Paulo, Brazil; Bruce Barblett, Perth, Western Australia, and W. Keith Ross, Dunedin, New Zealand.

Also, J. Albert Davidau, professor, Dental School of Paris, France, and his wife, Gisele Davidau, a dentist in private practice; Dioracy Fonterrada Vierira, professor at the School of Dentistry, University of São Paulo, Brazil; Nelson T. Lascala, instructor in the School of Dentistry, University of São Paulo, Brazil; Sven Forsberg, a dentist of Ängelholm, Sweden,; Ivan Oldmark, secretary-general of the Swedish Dental Federation, Stockholm, and Thomas A. Scahill, a graduate

You give food and friendship with every $1 package you send to the world's hungry thru the CARE Food Crusade, New York

dental student from Sydney, Australia.

Also, Robert Narion, a graduate student from the Eastman Dental Hospital, London, England; Max Wohlers Rivas, Mareo Antonio Aguirra, Cirturo Zepeda and Fernando Prado R., all members of the faculty of the School of Dentistry, Guatemala City, Guatemala, and Moises Lerman, professor at the School of Dentistry, University of Cordoba, Cordoba, Argentina.

DENTIST, WRITING BOOK, WANTS ANECDOTES OF DENTISTRY

Powell B. Trotter, retired dentist of Memphis, Tenn., is assembling material for a book he plans to call "The Country Dentist." He would appreciate hearing from anyone who will tell him of incidents that have occurred in the practice of dentistry —humorous, unusual, or worth recording in a book of this kind.

Dr. Trotter's address is 1694 Autumn, Memphis 12.

JOHN J. NEVIN BECOMES SOLE OWNER OF COE LABORATORIES

The recent purchase of all the outstanding stock of Coe Laboratories, Inc., Chicago, from Mrs. W. S. Rice gives Mr. John J. Nevin sole ownership of the corporation. He will continue to direct its operations as president and sales manager.

Other officers of the company are: vice-presidents, Mr. Albert P. Peyraud, Mr. James M. McCabe and Mr. Robert R. Sale; secretary and treasurer, Mr. Victor Murray, and assistant treasurer, Mr. Robert W. Cooksey.

DENTAL ASSISTANTS EXECUTIVE SECRETARY TO RETIRE DEC. 31

After twelve years as executive secretary of the American Dental Assistants Association, Mrs. Mary L. Martin will retire December 31. At the time Mrs. Martin joined the organization in 1948 she was the only employee, working in the ADAA office in La Porte, Indiana. There are now five full-time employees.

Mrs. Elma Troutman, immediate past president of the ADAA, will succeed Mrs. Martin. Mrs. Troutman has been a member of the association for 13 years and has served as committee chairman, district trustee, general secretary, first vice-president and president-elect.

Mrs. Dorothy Kowalczyk, who was the first paid subscription manager of the association, will become the business manager on January 1.

PERIODONTAL STUDY CLUB SCHEDULES ALL-DAY SEMINAR

The annual meeting of the Chicago Periodontal Study Club will take the form of an all-day seminar Sunday, February 7, during the period of the Chicago Midwinter Meeting. The seminar, which will be conducted by Marvin Sugarman of Atlanta, Ga., will be held at the Conrad Hilton Hotel.

Since attendance must be limited, it is suggested that reservations be made with Julius Caplan, 4802 Broadway, Chicago 40. Dr. Caplan's telephone number is LOngbeach 1-9345.

The liberation of a Western robot

Herbert M. Phillips, D.D.S., M.S.D., Chicago*

Never for a moment do we put aside our mistrust of the ideals established society keeps in circulation. . . . Society is full of folly and will deceive us. . . . The wisdom of tomorrow has a different tone from that of yesterday.

Albert Schweitzer

It was a joy to accept the request to take the readers of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION vicariously up a staircase of adventures with a new kind of man, Albert Schweitzer.

Most people are aware that this man, at the age of 30, gave up a spectacular career in music, in theology, in philosophy and started in medical school to prepare for a life of healing and teaching among the wretched natives of the jungles of French Equatorial Africa.

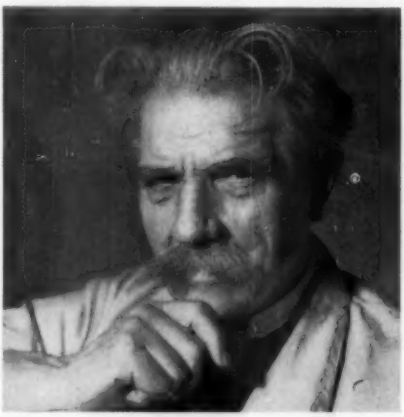
When the young doctor turned his back on all the cultural and financial "institutional" rewards Europe promised, he said, "What I wanted was an absolutely personal and independent activity to which I could devote myself as an individual and as wholly free."

He reiterates today, after being a jungle doctor for 40 odd years, "I feel it deeply that I can work as a free man when the lack of freedom is the lot of so many."

The adventure herein described started in 1956 when, with a small assortment of dental tools, I journeyed to Lambaréné, there to work in the dental clinic of Dr. Schweitzer's hospital. It was during this visit that I asked and received, after a brisk debate, permission to develop the Albert Schweitzer Education Foundation. But more of that later.

Like most visitors, I entertained the conceit that as a free man I could judge the real spiritual stature of the notable and controversial man, Albert Schweitzer.

Dr. Schweitzer's face is mobile, expressive mirror of his profound but simple philosophy



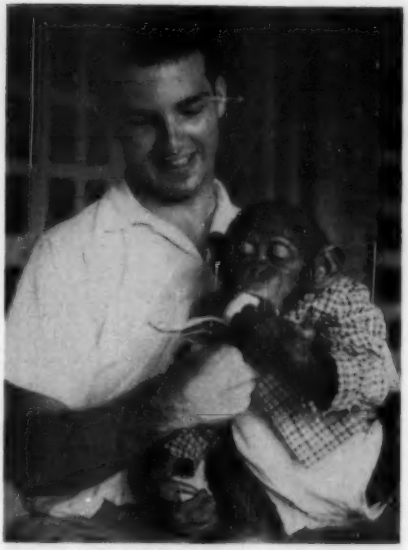
At the end of my first visit to Lambaréné, though I was humbled by the enormity of my "God-sized" errand, I was certain about several things. Lambaréné is no masquerade or bizarre publicity stunt. Dr. Schweitzer is living an ethic of compassion that parallels but also extends the pattern and spirit of Jesus. His free kinship includes reverence for subhuman "kith and kin" as well as all humanity.

While still in Lambaréné, I found Dr. Schweitzer was engaged in an ideological war. He calls the struggle "a merciless show-down with Western culture."

While visiting at Lambaréné, it became clear as high noon that I had heretofore falsely presumed myself to be a free thinker. Actually I enjoyed only a false sense of freedom within a playpen of preserved premises—"dialectical" premises—whose derivation I had never really examined and whose authority I had never really challenged or even consciously accepted. But now I reflected on Western standards as a form of mental pathology. I had been a victim of this neurosis which Dr. Schweitzer had escaped.

Dr. Schweitzer, through his wholeness in scholarship and his freedom from Western institutional beliefs, has been able to see cultural diseases that elude most diagnosticians. Allegorically speaking, he has stood alone at the bedside of a delirious world that is suicidally sick with deadly delusions. "The time must come," Dr. Schweitzer has said, "when doctors go out into the world of their own free will . . . as men, not as members of any particular national or religious body . . . but in atonement [for Western derelictions to the brown brothers] . . . and in the name of true civilization."

Main Street buzzes with the hum of rag-tag ambulatory patients who are practiced in waiting patiently for their medical examinations, treatments, pills and merciful surgery



I found the animal patients and guests of the hospital the most illuminating clue to the workings of Dr. Schweitzer's elemental and profound mind. Where else does a hospital boast that some but not all of the patients are people? The hospital has subhuman "clients" in casts, splints and bandages. The animal community suggests the cosmic dimensions of Dr. Schweitzer's new religion. My son is holding the chimp who later became my patient. He was caries free and had zero g'ngival crevices. His deportment was good, but his attitude was not clear enough to tabulate. (Note the diapers)

This present philosophical article is admissible in THE JOURNAL because health practitioners should consider the wider diseases of the hour. These are more perilous to world health than any germborne plague in history. Dentists should be able to help extract the fangs of cultural ills that threaten the survival of our species and perhaps all life.

NEW BINOCULAR VIEW OF FREEDOM FOUND IN LAMBARÉNÉ

Some visitors to Lambaréné feel a sense of destiny there, perhaps because this tiny human community is unique in a "good" but un-Western way. One suspects that Lambaréné may be a design for tomorrow's global principles of world federation. Let me explain.

If one is stripped of the hard core of Western notions about the universe as a creation of God and about natural rights and equality by law, it becomes perfectly clear in Lambaréné that the real universe is a duality containing interpenetrating elements of primordial freedom and factors of determinism.

Lambaréné is more than a barnyard surrounded by primitive buildings. It is a very special kind of unfenced zoo. In this forest setting, the kinship among plants, animals and man is overpowering, not as a speculative abstraction but as a basic observable reality. All life is one in this odd oasis, but only man is conscious of the essence of the life process, which Dr. Schweitzer calls "the individual's inviolable measure of freedom."

It can be observed that plants and animals also enjoy a measure of freedom. In this context, freedom is seen in essence to be a continuing capacity to alter external circumstances.

Dr. Schweitzer says, "We have discovered in the single cell an individual existence in whose faculties we see reflected the elements of our own capacity."

In Lambaréné it becomes undeniably certain that individual human beings, like units in the plant and animal kingdoms, are units of the real universe. In man's mind the universe is becoming conscious of degrees of freedom. From crystals to man, "individuals" act as catalysts.

It is quite clear in Lambaréné that evolution has been a process of the survival of the freest. Man is the freest creature. He is dimly conscious of his freedom, but he is far from being totally free.

While I was trying to unscramble the external strangeness that reflected the mind of the man I had come to judge, I was delighted to be drafted into working and teaching in the primitive dental clinic. Dr. Schweitzer had taken two short dental courses in Europe years ago, and his "two-chair" clinic with foot engine had seen many years of service before I arrived. In this picture, besides Dr. Schweitzer, are the brilliant Hungarian, Dr. Richard Friedmann, and the lovely Dutch surgeon, "Doctoress" Margariethe van der Kreek

In man, self-consciousness of freedom makes possible an ethic based on reason, an ethic that seeks to maintain and augment individuals' capacity for free activity.

LAMBARÉNÉ: A NEW FORM OF FREE SOCIETY

Lambaréné is a miniature free society. However, there is no pretense that men are created or that they are all equal. They are indeed unequal in their capacities for free activity. There are no inalienable or natural human rights observable, and thoughts of grace are jests in the bloody jungle; but every individual man, animal or plant has a precious measure of freedom of paramount value to the individual and affirmed by the very nature of the life force.

There is no law of the universe to which we can appeal for guidance in human relations, but there is one covenant upon which free men can agree: Reason ordains equal concern by all for the unequal measure of freedom found in each individual.

In Lambaréné, following this unspoken and unwritten covenant, the freest individuals volunteer their capacities for free activity to help alter external—or alien internal—circumstances for the benefit of the indigenous peoples and the handicapped animals and plants.

Work proceeds at Lambaréné not by democratic franchise or by dictatorial despotism. There are no contracts and no laws. Duties are distributed in accordance with individuals' obviously unequal capacities.

The workers at Lambaréné are not

motivated by privilege, prestige, profit, or material gain. Helpers are housed and boarded but not paid. Rewards are internal, involving self-perfection, self-fulfillment and growth in rational self-determination. The richly endowed ask for no advantages or distinctions. Leadership is natural and devoted to the freedom of the less free.

All external things are subjugated to the primacy of the single ethical covenant. Individuals are perfected in Lambaréné in the responsibilities of liberty. There is a natural hierarchy of cooperative self-giving under voluntary auspices.

For all of its dirty face, Lambaréné has a global dimension, a concept of internal progress, a certainty beyond agnosticism, and a dream of efficiency in humaneness unknown in the Eastern or Western world.

Allegorically speaking, when Lambaréné is censured by "true believers" in external or institutional values, it returns a confident, serene and cosmic smile. It is a free society.

BACKGROUND TO THE SPIRITUAL SUMMIT

After my first visit to Lambaréné I tried to grasp the significance of, and to apply, the concept of natural freedom and the concept of a wholly free society as I had witnessed these principles in embryo in Lambaréné. Slowly I began to realize that dialectics—systems of speculation beyond observation—were the enslaving Leviathans that had collectivized and now cosmically imperiled the human race.

Like most Americans I was ignorant of the Communists' gospel, "dialectical materialism." Driven by curiosity, I became familiar with the core propositions running from Marx to Krushchev and Mao Tse-tung.

For summary purposes, we may quote Joseph Stalin[1] to pinpoint the cosmic epicenter of the issue: "Dialectical materialism is the world outlook of the Marxist Leninist party. . . . Historical determinism is an extension of dialectical materialism to the study of social life."

Though Dr. Schweitzer's books bearing his nonmaterialistic, nondialectical world outlook have been translated throughout the world, I discovered in the Lenin Library of Moscow that not even one of his volumes except his *Bach* had been translated into Russian. Only a few of the Russian people have heard of Dr. Schweitzer. Representatives of these rare individuals with whom I talked paid him the usual tributes.

In the summer of 1958 I took a course at the Institute of Humanistic Studies in Aspen, Colorado. Aspen in July 1949 was the scene of Dr. Schweitzer's only visit to the United States. He was brought from Africa to be the principal speaker at the Goethe Bicentennial Festival.

As in the Lenin Library, likewise in the library of the Aspen Institute, Schweitzer's books and even his Aspen address were absent. The "Great Books of the Western World," however, were displayed with pride.

It thus came to my attention forcibly that the Aspen Institute is directed by dialecticians. These men look back in history, principally to Thomas Aquinas, for much guidance on problems today. And they have been introducing dialectical methods into higher learning in America.

With this in mind, I embarked on a new piece of research in Schweitzer's writings. I discovered tardily that Dr. Schweitzer, in his monumental *Philosophy of Civilization,* neglects the fateful roles of Marx and Engels. He omits mention of Aquinas in particular and medieval scholasticists in general and never discusses the subject "dialectics" as such.

As the plot thickened, evincing a grand design, I planned a visit to Dr. Schweitzer in April 1959 to get his interpretation, if possible, of the hidden significance of dialectics.

Before leaving, I found that, whereas

the people of the United States voted Dr. Schweitzer in a Gallup poll the third most esteemed man in the world, (Eisenhower was first, Churchill second) leaders in Washington had refused lay requests on numerous occasions to bestow on him the kind of official respect he has been given in European countries.

The pattern of paradoxes disclosed the explosive trigger zone. Dialectically oriented leaders of institutions in Russia and America ignored Dr. Schweitzer's dramatic role. But multitudes were moved by Dr. Schweitzer's challenge, even though his epic life had eclipsed his dynamic world view.

EAST-WEST DIALECTICS VERSUS HONEST OBSERVATION

On my last visit to Lambaréné, I received what remains in my memory a treasure beyond measure. It came as a gesture of reward for dental services. Dr. Schweitzer offered to recompense me with a lecture on the history of dialectics.

The scene was his room. The audience included my wife and son and many staff members. Dr. Schweitzer ad-libbed for me, through a translator, an evaluation of dialectical methods and of history's pageant of dialectical thinkers.

Dialectical methods involve speculations about the universe, life and goodness. These speculations are based on real or imagined observations that are then fabricated with fanciful projections into a closed thought system, called either a philosophy or a theology. Dialectical system builders have created the doctrinal philosophies which canonize the fictitious institutions that enslave men's minds. Dr. Schweitzer, on the other hand, belongs to the suppressed tradition of free thinkers and honest observers of the universe, life and goodness.

Dr. Schweitzer explained to me how Thomas Aquinas in the twelfth century fused primitive Christian dialectics, based on the speculations about Creation and Biblical miracles, with the encyclopedic speculations earlier embroidered into a system by Aristotle. The resulting doctrinal and dialectical merger of fantasies became hardened into Western Christian theology.

Renaissance scientists, having extended senses with precision instruments to augment their observations, smashed and scattered the dialectical premises of the Hellenized version of Christianity that imprisoned the minds of the Western world. The splintered pieces lingered but no longer formed a grand view of the universe.

Dr. Schweitzer explained that Marx and Engels, seeking a new, neatly sealed system, invented a totally new dialectical view of the universe. Building on the Newtonian concept of the universe as a machine, they speculated that man was the unfree product of his economic environment and that history was progressing inevitably toward the millennium of Communism. "Scientific socialism" was the new catechism that grew out of these speculations.

According to Dr. Schweitzer, Marx was a living paradox. He was godless but not irreligious. He created a new systematic opiate of the people from his own gospel. He was himself a living denial of his premise that man is an economic animal, for in serving his new religion he almost starved to death. Likewise, his own stubborn immaterial drive, and the vast effects of his willfulness on world history, are a denial of materialism and determinism and a nullification of the notion of inevitable progression in the historical process. The life of Marx proves that much of history is biographical, not necessarily progressive, seldom materialistic, and certainly not deterministic or mechanical.

Dr. Schweitzer made it clear that the flaws of Communism are in its premises and in the design of history its founders invented. Once the premises are accepted, the logical social superstructure appears

My bulky contributions—chair, engine, cabinet, generator, and so on—went as companion pieces to a herd of goats. Penned in this truck, they went by boat from New Orleans. The motorized condensed caravan included chemotherapeutic drugs and other cargo, all transported gratis. Here the truck arrives by barge

Today the dental suite, though not fashionable, is as commodious as the best departments of the hospital. However, the range of treatment has not been extended, only the efficiency

to be a flawless factory-made package of values for masses. And to the degree that it made use of scientific laws, in place of outmoded theories of Creation and miracles, Communism was able to gain sway over the minds of the starving, restless masses in the heart of feudal Eastern Christendom. Russia imported the Marxian dialectic whole, and in the course of time the contagion has spread even to China.

In the West, the fragments of Hellenized Christianity have been preserved by educators and politicians in Europe and particularly in the dialectics of the American system. Western Christendom has been materially prosperous. Westerners, however, lack a coordinated view of the universe and a clear theory of progress to espouse and to export as aid and comfort to suffering humanity.

The Marxian dialectical system of "scientific socialism," based on Newtonian science, with its denial of the facts of willing and man's capacities for freedom, is a formidable opponent for the fragmented dialectical system of Western Christendom.

But the premises of Marxian "scientific socialism" are themselves obsolete. Today the "new physics," with its uncertainty principle and its field theory, is the world's greatest asset against the dialectics of materialism and historical determinacy. Man's capacities for freedom, and the facts of willing and volition, are realities that are consonant with the most refined observations about the universe of which we are units. The indisputable sense of freedom at the core of every man's consciousness, which Dr. Schweitzer calls the "will to live," is the denial of the notions of determinism and "dialectical materialism" that are the premises of Marxian Communism.

Keen observers must see that freedom is real and precious to individuals, yet it is perishable. It belongs only to individuals. The truth about freedom must be codiscovered with the utmost speed to bridge the gulf between the two hostile camps that divide and threaten the human family. Man must become conscious of the freedom that is present in the universe and must study the means to develop it, or freedom will be lost in the steely mesh of growing collectivism.

The conclusion of Dr. Schweitzer's dissertation on dialectics, only a portion of which is reported here, reveals the core problem of the world crisis. East and West are divided over two obsolete, irrational dialectical differences. The clash between the leaders is violent and irreconcilable. Yet the peoples of the world are not deeply committed, nor are they as divided as the leaders who are directing destiny. If the suicidal war comes, it will be described as the ultimate infamy—annihilation without representation.

One of the thorniest problems in the fragmented West is that it is subdivided into rival nations. The nation-state, once a useful fiction, has lost all creative value. Only global thinking can lead to a free federation in which the individual, not the nation-state, is again the sovereign real unit. The individual is not a dialectical fiction but an observable reality—a unit with a vast potential for freedom.

FREE ASSOCIATION AND RATIONAL FEDERATION

In viewing our present world situation, Dr. Schweitzer would say today what he wrote in his *Philosophy of Civilization* more than 35 years ago: "There remains nothing for us to do but to try a radical change in policy." We know he is engaged in "a merciless show-down with Western Civilization." He is pioneering a revolution in reverence. He is a savior type with a message of salvation. But what does this mean for the individual who cannot escape to Africa and found a new Lambaréné?

Believing that Lambaréné is not a place but a concept of human associations in which Albert Schweitzer is only a pio-

neer, a small band of interested individuals in February, 1958, formed the Albert Schweitzer Education Foundation with headquarters in Chicago. This tax-exempt, nonprofit fellowship is an experiment within the heart of the colliding myths of the Western market place. Its purpose is to make the ideas of Dr. Schweitzer accessible to individuals who may have known only of his humanitarian deeds. His methods of honest scholarship and the truths he has gleaned from observing nature can be co-discovered and co-experienced and even refined through deeper awareness by individuals everywhere. People recognize their saviors by discovering the message of salvation for themselves. This can happen in the midst of tribal savages dwelling in the urban jungles of Western "civilization."

The first principle of the "radical change of policy" is absolute honesty in elemental issues. Dr. Schweitzer says in many places in his writings, "It has been my principle never to express more than I can experience." It is, we are convinced, possible for individuals to stop in their presumptions of wisdom, pretensions to mystical truths, even their beliefs in the story of Creation.

The absolute honesty of the radical change of policy requires individuals to pass through the desert of agnosticism to an illimitable vision beyond. For example, Dr. Schweitzer says, concerning his use of the word God, "I use the word God only to impart to others my inward experienced thought in all of its original vividness."

The radical change of policy involves a new view of the nature of the universe, of life, and of goodness.

In the rational creatures composing the human family, the capacity for free activity is "at the core of our being . . . the truth of our consciousness." Dr. Schweitzer asserts, "The being that can be influenced in its development by us is man."

Producing the highest possible freedom

The Albert Schweitzer Education Foundation has headquarters in Chicago. Mrs. George Kufrin and Mrs. Harry Diehl are seated in the Foundation's reading room beneath drawings done in Lambaréné by Frederick Franck

for the greatest possible number by "the spiritual perfection of individuals"—this and only this is "the real and final object of civilization." When economics is subjugated to ethics, spiritual perfection gets priority always and opposes "material slavery," but this does not mean asceticism. As Schweitzer says, "The highest possible material freedom for the greatest possible number is a requirement of civilization."

In a modest way like Lambaréné, the Albert Schweitzer Education Foundation is a nucleus of the widest possible free associations. We do not intend to organize into a new rival institution to challenge contrary institutions. Our voluntary association is to be a focus for folks who believe that individuals with varying capacities for freedom should have an equal concern for enhancing their own capacity and the capacities for freedom of the less free. As in Lambaréné, the individual is the unit of association and the sovereign good.

An astute observer will sense the Jeffersonian flavor of Dr. Schweitzer's demand for "the fullest possible development of individual faculties and the widest possible spiritual and material freedom for each individual." Those more astute will remember that the free thinkers of the eighteenth century were struggling with ways of justifying liberty, fraternity,

brotherhood and human love at the global level. Governments were instituted to preserve and enhance the good of individuals. This is the spirit of Lambaréné and, we hope, of the Albert Schweitzer Education Foundation.

Dr. Schweitzer offers the perishing world for its evaluation a new view of freedom as part of the world view that he calls "reverence for life."

Our Foundation, like Lambaréné, has volunteers who have contributed time and service and counsel. The free association stretches to all corners of the world. We aim to represent a free society in the midst of many dialectical tyrannies.

As is true at Lambaréné, there are individuals who are able at the moment to contribute only financial aid to the objectives of the Albert Schweitzer Education Foundation. These gifts are indispensable to the growth of our free society. Gifts to the Albert Schweitzer Education Foundation are used to make Albert Schweitzer's ideas more accessible and to aid scholarly research in ethics. Support for the Lambaréné hospital is handled through the Albert Schweitzer Fellowship, whose offices are at 156 Fifth Avenue, New York City.

Presenting Nobel Peace Prize speech, Oslo, Norway

When and if funds come in a floodtide, the Albert Schweitzer Education Foundation will try to launch a Manhattan-sized study project to illuminate the elemental qualities of human freedom. Only an ideological war is rational today, and it is for this that we must prepare. As Schweitzer states repeatedly, the issue is not East versus West. It is simply human freedom versus collectivism. H-bombs cannot solve this issue or any other. World tensions are breeding excessive collectivism in the West as well as in the East. Unable to arbitrate their dialectical differences, East and West continue their race to develop infamous and irrational weapons. The cost of these weapons is staggering. Whether political leaders approve or not, the people should insist that world scholarship be focused on the problem of human freedom. It is my hope that the Albert Schweitzer Education Foundation will initiate such a project as soon as possible.

Meanwhile, the small contributions that have come in to the Education Foundation are being used by volunteers to develop itinerant lectureships on Schweitzer's philosophy. Dr. George Seaver, Schweitzer's foremost English-language biographer, is fulfilling a lecture schedule involving more than 30 colleges and universities in the United States.

Recorded educational television programs on Schweitzer have led to the development of our lending library of films. Included in the library are also copies of Erica Anderson's Oscar-winning documentary "Albert Schweitzer." The Foundation has prepared lists of the most important Schweitzer writings and is accumulating volumes for circulation to interested readers.

In conjunction with Dr. Schweitzer's 85th birthday, January 14, 1960, the Education Foundation is sponsoring an

Mrs. Marion Phillips; Robert Coburn, director of the Community Fund Joint Appeal and secretary of the Albert Schweitzer Education Foundation; Mr. James S. Pennington, Jr., treasurer and legal counsel, and Herbert M. Phillips. Scene is the Foundation office, 55 East Washington Street, Chicago

essay competition on the subject, "The Challenge of Albert Schweitzer." Awards are offered for the best presentation of Dr. Schweitzer's philosophy, with or without agreement. Judges are international Schweitzer scholars.

If we are right in believing that co-discovery and co-experience under the auspices of absolute honesty are the only road to global ethics and global law, then centers of free federation like the Education Foundation can act as pioneer efforts of forming free societies.

The vision herein outlined is not the basis of a new cult nor a society for the adulation of a new savior. It is a vision that rests on honest observation, and it seems to be the most rational, creative, and positive open-ended philosophy of elemental and universal freedom yet to emerge. It is simultaneously an agenda for peace between dialectically opposed peoples. It offers a renaissance in which each man's measure of freedom is the essence to be reverenced by all.

Our Foundation uses Dr. Schweitzer's name with his consent because he is a pioneering trail-blazer of a new form of free association, a new community of ideals, a commonwealth of principles within current chaos. He has often said, however, that truth belongs to mankind. He expects others to go beyond him in their awareness of the implications of the will-to-live in the life process.

In a recent letter to the Foundation, Dr. Schweitzer says, "If my philosophy will eventually emerge, the success will have to be credited to the free men and women who have undertaken the responsibility of making the concept of reverence for life understood throughout the world."

*President, Albert Schweitzer Education Foundation, 55 East Washington Street, Chicago. Author of a series of articles "Around the World by Tooth and Nail" and "Safari of Discovery: The Universe of Albert Schweitzer."

The photographs were taken by Olga Deterding with the following exceptions. The picture of the Albert Schweitzer Education Foundation headquarters was taken by George Kufrin. The cover photograph and the one on the inside front cover showing Dr. Schweitzer with leper children were taken by Erica Anderson.

1. Stalin, Dialectical and historical materialism. New York, International Publishers, 1940.

OPERATION LEG

Three hundred and fifty lepers were living in a special village that Dr. Schweitzer built for them in his role of modern liberator from their demonic blight. His Nobel Peace Prize money had paid for the corrugated roofing of their dwellings.

Bie Albert came to Lambaréné from a great distance. He had been given up for lost by witch doctors. His plight had been worsened by faulty diagnosis and consequent incorrect treatment at a government hospital. Finally leprous parents landed at Lambaréné with their dying burden. They had paddled a great distance down the river system with a chicken and few francs to pay the great white doctor. The uncorporeal will that organized the boy's diverse functions had all but lost its lust for living. Tender hands at the Schweitzer hospital lifted what was a stinking mess beneath some rags from the canoe. Loving hands washed the leprous flesh that was then undergoing terminal dissolution. Antibiotics and drugs for yaws, malaria, intestinal parasites, and vitamins and iron tablets for scabies and anemia converted the animal spirit once outward bound into an intelligent, vigorous but sensitive boy. Only his foot remained necrotic mush under sodden skin.

When further treatment proved futile, the useless foot was removed. After years of handicapped locomotion, a chain of mercy involving three continents finally brought the growing boy an artificial limb. He looked at himself and said, "Having a new leg is like having new eyes, because the world looks so different now."

Six years after his arrival in Lambaréné, Bie Albert's health is again uncertain. He cannot wear his new leg all the time because with use the flesh on the stump breaks down into painful ulcers. This talented, artistic boy needs more love and more help still.

Dentistry for the elderly

Irving R. Rutkin, D.D.S., and Morton H. Leeds, Ph.D., Indianapolis*

We would like to describe an experience in dental care for the residents of a home for the aged. The home was gradually expanded from 17 beds in 1952 to the present capacity of 43 beds. Our observations cover a six year period with a total of 120 persons. Their average age was 80 and there were an equal number of men and women.

A comprehensive medical care program was installed in 1952 with the first expansion of the home. Dental care was included in this program. However, since the necessary facilities for constant dental care were not available at the home, it was agreed by the dentist and the home administrator that the best possible care would be provided as expressed needs arose. In addition, yearly surveys would be established, so that any unexpressed dental needs might be detected as well.

In our desire to provide the best dental care after our first survey, we felt that we would be rendering a fine service if we replaced all vulcanite and old acrylic resin dentures with new ones, as many of the residents' dentures were 25 and 30 years old. We assumed that practices that apply to younger adults would also apply to older adults as well. We soon discovered that our assumptions were faulty. The results were most unsatisfactory because the residents did not want new dentures unless the old ones were definitely uncomfortable.

In several instances, where the person was completely edentulous and wearing only a single denture, we proceeded to make the opposing denture. One instance only was successful, because the patient really wanted the denture. The others were unsuccessful and the dentures were not worn.

There was little success when upper and lower dentures were made for an individual who had been edentulous and without dentures for many years. In such instances, the task of learning a whole new set of oral adjustments was almost insuperable. Despite many trips to the dental chair, patient hours of reassurance and encouragement regarding appearance, the stressing of the value of better nutrition with dentures, and all the other help available, the results were not good.

In a very real sense, the adjustment of old age to change was hard to achieve, unless initiative for the change originated from the individual himself. In instances where we had success with major changes, even surprisingly drastic ones, it was because motivation was strong enough in

the person involved to enable him to reach his goal.

RESIDENT SURVEY

An analysis of the present 37 residents of the home follows:

1. There are 20, or 54 per cent, who have and wear both upper and lower dentures. Outside of the usual complaints of sore spots and looseness they manage very well. Some of these will remove their lower denture when eating.

2. There are 3, or 8 per cent, who wear only an upper denture. They do not show any desire or express any need for a lower denture.

3. There are 2, or 5 per cent, who wear partial dentures. They get along well except for needing an occasional adjustment to tighten the partial dentures.

4. There are 3, or 8 per cent, with six or less teeth, who have no replacements and desire none. These were studied carefully and will be discussed when we summarize our observations.

5. There are 3, or 8 per cent, who are edentulous, and wear no dentures. Two of them definitely do not want them. Dentures were made for the third who showed a slight interest in obtaining them. However, he gave up immediately after receiving them and made no further effort to try to wear them.

6. There are 6, or 16 per cent, who have their own natural dentition. They get along very well and have periodic dental check-ups.

We would like to discuss the residents in the second, third and fourth category. We have found that the edentulous persons without dentures, those who use only a single denture, and those with six or less teeth remaining, usually know their capacity and manage very well. They eat their meals nicely, perhaps taking a longer time to finish a meal. Their speech is definitely affected; however, it seems that these individuals do not have any of the disturbances of the gastrointestinal system that might be expected because of their inability to masticate properly. Costen's syndrome, which is pain of the temporomandibular region, with occasional deafness and neuralgias of the face, and which could be expected to occur, has not been found. Changes of facial contour such as protruding chin and wrinkling of the oral commissures do not disturb these individuals. Dryness of the mouth seems to be a common complaint, but, as we know, there is a diminished salivary flow in the aged as well as a decreased ptyalin content. Those who wear both upper and lower dentures at all times have fewer complaints about dryness of the mouth than do the others.

A dental education plan is in effect. Residents are lectured on the care of artificial dentures; the importance of proper digestion; the social effect and the effect on morale of good esthetics. Persons with their own dentitions are encouraged to have periodic dental check-ups. The point we stress is that dental care is available, and they know that they can obtain it whenever necessary.

TREATMENT PLAN

We now follow this treatment plan:

1. On the yearly surveys, all dentures needing repair are fixed. Broken or cracked teeth are replaced. We do not do more than the individual requests, as we always get complaints if we do not follow instructions to the letter.

2. After the survey we clean and polish all dentures. All repairs are made, if possible, within 24 hours, so as not to inconvenience the residents.

3. Emergency repairs are made the same day, with the prostheses being picked up in the morning after breakfast and returned before dinner in the evening.

4. Relining and rebasing seem to be more satisfactory services than making a new set of dentures.

5. Bed-ridden patients receive the

same care as ambulatory patients. A portable dental engine is used at the bedside to relieve sore spots. Relining of dentures is also done at the bedside with a self-curing synthetic resin.

6. Patients who have some teeth remaining are encouraged to have periodic prophylaxis, and restorative work done when necessary.

SUMMARY

It is apparent that institutional dental patients in an advanced age group do not, as a rule, desire new dentures or drastic oral changes. A conservative policy of repairing, polishing and relining seems to be the choice of maintenance. The exceptions to this policy should be only in the case of those who are well oriented to their general needs, who are flexible in daily living, and who are essentially self-motivated and have adjusted well to the changes of old age. For these, the usual range of dental care should be made fully available.

3120 N. Meridian Street

*Executive director, Borinstein Home for the Aged.

Occlusal refinements on completed dentures

Victor H. Sears, D.D.S., Vallejo, Calif.

No matter what occlusal forms are used and no matter how carefully the teeth are arranged at the try-in stage, the occlusion of the teeth can be improved after the dentures have been cured. If care is taken during all of the steps in construction, the occlusal refinements may consist merely of removing slight irregularities that otherwise would prevent smooth gliding of the opposing teeth over one another. Smooth gliding assures greater protection to the supporting structures and greater comfort to the patient.

Final refinement of the occlusion is traditionally accomplished by moving the articulator or by having the patient execute protrusive and lateral jaw movements with abrasive paste between the opposing tooth surfaces.

Abrasive paste is not entirely satisfactory. Whether used with the denture on the articulator or in the patient's mouth, it is messy. Care must be exercised to keep the paste from the working parts of the articulator. Also, the abraded tooth surfaces cannot be examined and tested until the paste has been washed off. Finally, with the usual abrasive pastes it is not possible to limit the cutting to the upper teeth or to the lower ones because all surfaces in occlusal contact, whether upper or lower, are reduced at the same time. It is desirable sometimes to reduce the lower interfering projections, for example, without abrading the upper ones.

Although it is desirable to reduce upper or lower projections without altering the opposing teeth when all of the teeth are of the same material, selective abrading is still more important with the adoption of teeth which are made of materials having different resistance to abrasion. This is because it is important to preserve the sharp edges on the teeth of harder material. The harder material may be considered as the cleaver in a block and cleaver combination, whereas the softer material is the block. It is important to preserve the sharpness of the cleaver; the size and form of the block are of lesser importance.

When acrylic resin teeth (old terminology, plastic teeth) are opposed by porcelain ones, it is advantageous to preserve not only the cutting edges but also the original glaze on the porcelain surfaces. Special abrasive paste can be used to protect the porcelain—a paste with a lower hardness index than porcelain, but harder than resin. One such material is apatite (calcium phosphate). With interposed apatite paste, the resin teeth will be reduced and the porcelain ones will remain unaffected.

There is another way of confining the abrasive action to upper or lower teeth. It consists of interposing one-sided abrasive strips. For use on the articulator, ordinary thin sandpaper or carborundum paper, or preferably garnet paper of grit number about 5/.0 can be used. In the patient's mouth a waterproof garnet paper is preferable.

The standard 9 by 11 inch abrasive paper obtainable in any hardware store can be cut into convenient-sized strips. It can be cut to make three 3 by 11 inch strips which are convenient for use when the dentures are mounted on the articulator. For use in the patient's mouth, the paper can be cut into smaller pieces.

If, when the denture is on the articulator or in the patient's mouth, it is necessary to cut only the lower teeth, for example, the strip is placed between the opposing teeth with the smooth side up. Then with the lower teeth in centric position and various eccentric positions, and under light closing pressure, the strip is pulled along the surfaces to be reduced. The effect is similar to that obtained in finishing the gingival margin of a filling.

If, for example, there is interference on the incisors in protrusion, the strip is pulled through as the teeth are held lightly in protrusion. This reduces the incisal interferences evenly.

With interfering contact on the right posterior teeth, the strip is pulled through as the lower denture is held in the right lateral position. The strip may be used here only on the right side or it may cover both right and left sides. Ordinarily, both right and left sides should be covered, but sometimes it is desirable to cover only the side to be reduced.

Of course when the mandible is in centric relation, there should be simultaneous contact of right and left teeth as they are brought together. This condition is produced by pulling the strip between the teeth lightly held by the articulator member, or with the mandible in centric relation.

If there is any considerable discrepancy in centric relation or any eccentric closure, it is advisable to locate the interferences with carbon paper markings and grind the marked surfaces with mounted stones before using the abrasive strips.

The cuspids are not to be neglected. With the dentures held in protruded right lateral position, for example, the strip should be drawn across the right cuspid to assure sufficient reduction here.

After smooth gliding has been produced as here suggested, further refinement is usually possible with the use of occlusal testing wax. This wax is obtainable in opaque sheets with a coating of adhesive on one side. The adhesive side is pressed on the lower teeth if they are the ones to be reduced.

With some soft food such as banana

or with no food at all, the patient is told to go through the chewing movements. Interfering places are thus disclosed—areas not sufficiently abraded by the strips. Before the occlusal wax is removed, the denuded areas on the teeth are marked with a soft graphite pencil. The wax is then removed and the marked areas are further reduced with soft abrasive wheels.

After all of these refinements have been completed, any rough surfaces should be buffed to provide added comfort.

Dentures refined in this way assure superior service when they are installed. But since all dentures settle, patients should be recalled at intervals for inspection and possible further refinements. Tests should be repeated to make certain that there is no excessive pressure at the anterior part of the occlusal scheme in either centric or eccentric relations.

646 Washington St.

Reader's Choice • The only advice, indeed, that one person can give another about reading is to take no advice. One should follow his own instincts to use his own reason and to come to his own conclusion. . . . After all, what laws can be laid down about how to write and how to read? To admit authorities, however heavily furred and gowned, into our libraries and let them tell us what and how to read, what value to place upon what we read, results in destroying the spirit of freedom which is the breath of those sanctuaries. Everywhere else we may be bound by laws and conventions—in writing and reading—there we have none. *Virginia Woolf, The Second Common Reader.*

the reader comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

WHEN MASS PRODUCTION INVADES THE HEALTH PROFESSIONS

What happens when the occupants of the Ivory Tower move down to a basement apartment? When Longhair gets a crew cut? When culture breaks loose and inundates the life of the so-called peasant? When, in other words, culture, in watery form, flows into the lives of the untutored? Is that good or bad—that is, good or bad for culture or for the peasant?

So far as art is concerned, when mass distribution media take it up, part of its appreciation goes by the board for lack of adequate background. However, more serious harm might result from mistaking a part for the whole. When a part is taken for the whole, beauty and truth suffer from sheer distortion.

Now, what happens to the ethics of a health profession when the veil of privacy is ripped off; when the base of individual concern is pried loose and mass production of the assembly lines takes over? The primary concern of a health service has always been a tender involvement in the idiosyncrasies of the stricken fellow man—what happens when this human, this intimate, this therapeutic warmth is replaced by an impersonal, coldly scientific efficiency?

One hallmark of the sensitively-attuned modern man has been his love of, and respect for, personal privacy. In contrast to the fishbowl existence of lower forms of life, including that of primitive humans, modern man has turned his humble home into his castle where he, and he alone, is king. No one can invade it without warrant. Respect for privacy is basic and has long been established a vital part in civilized living.

Yet, in the midst of this general fluidity that has followed the leveling, or democratization, if you will, of artistic barriers, aided and abetted by industry's depersonalization of many forms of our lives, the one area of exclusivity still remaining—the sanctum of doctor-patient relationship—is now being threatened with engulfment.

The area of privacy is constantly being narrowed.

Consider the following: there is nothing that one guards with greater zeal than his own physical being and well-being. When you are ill, the doctor is the only privileged person before whom you agree to strip clean and entire. It is then that many of the elaborately-built veneers that keep a frightened ego captive are laid bare. Such complete revealment is made possible only in an atmosphere of revered confidence and intimacy, an atmosphere which, over the years, has been sanctified by religion and tradition and has remained inviolate—that is, until today.

Today, this last rampart behind which a driven ego finds refuge, has been broken wide open. Today, when ill, you are whisked along on a medical assembly line, from radiologist to internist to neurologist to ophthalmologist to proctologist to hematologist to dental specialist to psychiatrist, although not necessarily in this order. Your precious privacy has become public property. The insurance people have now divided you into segments, catalogued and evaluated each part in money terms. So much for the loss of an eye, a leg, and so forth. Progress marches on. Progress, in the person of the actuarial agent, wants to know.

Our insurance dentist will hardly be of a mind to take time out to soothe and to allay the fears of a trembling patient; he will no longer be engaged in arresting the ravages of tooth decay: instead, he will primarily be processing fillings at so much per, and will only incidentally pay his respects to what the older generation of dentists have always considered vital in the maintenance of a balanced, self-respecting individual. The patient will find his (or her) pet idiosyncrasies unceremoniously lumped into a number—in triplicate; the authorization will read "five cavities" while the

dentist will metamorphose into an official peg inside a bureaucratic wheel.

Where spoon feeding is called for, efficiency experts and wholesale distributors are out of place. Moreover, the sense of responsibility, that ancient bedrock of honest effort, shrinks and finds itself faced with dangerous temptations when a close personal relationship is suddenly widened to embrace impersonal numbers.

During all of these many years, the patient has been the aristocrat in the dental office without knowing it. The dentist, during these same years, has been the devoted, much-worried guardian of the patient's dental health, and aware of it only too well. Now attitudes and loyalties are shifting. However, since the basic dignity of man and what we refer to as the eternal verities are constant, only outer delineations are affected.

David Tabak, D.D.S.
335 S. 2 Street, Brooklyn, New York

MORE ON FLUORIDE TABLETS

Dr. Menczer's letter in the September issue of THE JOURNAL (page 542) came as no surprise to us since we had had a personal communication of similar nature from him. We were somewhat surprised that THE JOURNAL saw fit to publish it since it made accusations, drew conclusions, and presumed outcomes with no supportive data. Space would not be available for documented refutations of Dr. Menczer's undocumented statements.

At this point we would like to state that the research technics employed in our study, "The use of systemic fluoride by American dentists," are universally used by research groups including the Bureau of Economic Research and Statistics of the American Dental Association; that our study does not deal in opinions but rather with practices as our report will show, and that we have no apologies to make for the source of funds necessary to conduct the study. Much larger and more expensive research projects have been underwritten in university research programs by private funds.

In a letter we received from the president of the American Association of Public Health Dentists, of which we believe Dr. Menczer is a member, we were told that "we need the information you have been able to obtain."

We sincerely hope that when and if our study is published any misunderstanding or misapprehensions will be cleared up.

In the meantime, we wish to apologize to Dr. Menczer and numerous other interested dentists for our failure to send personal letters to them. Interest in the study has been excellent and we have over 12,000 tabulated responses to our questionnaire, together with a considerable number of requests for further information.

Robert E. Dudenbostel, D.D.S.
Dental Health Officer
Jackson County Health Department

Deward K. Grissom, Ed.D.
Associate Professor of Health Education
Southern Illinois University

Sheldon S. Steinberg, Ed.D.
Associate Professor of Health Education
Southern Illinois University

. . . AND STILL MORE

I read with interest in the letter to *The Reader Comments* section of the September issue of THE JOURNAL the comments of Dr. Leonard F. Menczer on the use of fluoride tablets. I do not believe that Dr. Menczer's comments are valid or logical in the light of our present-day population distribution throughout the nation. Furthermore, I do not feel that any conflict should exist between municipal fluoridation and the use of systemic fluorides in non-municipally fluoridated areas. I base this on the reasoning that if the object is to prevent carious lesions in the deciduous teeth, and from then on throughout life, why should the method be limited to one procedure?

The most recent statistics indicate that approximately 40 million persons live in natural and municipally fluoridated areas in the United States. This means that the 130 million other persons in our nation have no means of availing themselves of the protection offered by sodium fluoride, except through dietary supplements. Are these persons to refrain from using a supplement, prescribed by their dentists, until municipal fluoridation is available in their communities?

Dr. Menczer failed to point out the fact that population residential movement is currently from urban to suburban, which in many cases means private water supplies in the form of wells and cisterns. To these millions, municipal fluoridation never will be a reality.

Those of us who are vitally concerned with the health of our nation are sympathetic with Dr. Menczer's public health approach to this problem, but not at the cost of poor dental health to the majority of our population who now live outside municipally fluoridated areas. Every dentist owes it to his patients to investigate new technics which can contribute to a higher quality of dental care.

Ralph T. Murray, M.S., Research Assistant
Health Organization Research Program
St. Louis University

cases and comments

REMOVAL OF ODONTOMA AND EXPOSURE OF CUSPID TO FACILITATE ERUPTION

By Leonard L. McEvoy, D.D.S., Hollywood, Calif.

History • The patient, a boy aged 13, was referred to me by his orthodontist in January 1952. He was under orthodontic treatment and had a retained lower right deciduous cuspid. There were no objective symptoms otherwise. The patient was in good health.

Roentgenographic Examination • Roentgenograms of the region disclosed a deeply imbedded cuspid under the deciduous tooth. The root was formed almost to the apex. In the region between the crown of the permanent tooth and the root of the deciduous tooth was a round radiopacity about 1 cm. in diameter (Fig. 1). This was tentatively diagnosed as an odontoma.

Operative Procedure • On January 6, 1952, under general anesthesia of trichloroethylene with nitrous oxide-oxygen, the operation was performed. The deciduous cuspid was removed and a labial flap employed. The odontoma was composed of many small hard objects resembling tooth structure and the whole had a well defined fibrous capsule which was removed. The permanent tooth was exposed for an orthodontic appliance attachment and the flap returned to position and sutured (Fig. 2). The removed specimen was sent for pathological examination.

Pathologist's Report • Histologic examination disclosed small pieces of tooth, dentin and enamel. There was a piece of soft tissue with a rather loose, myxomatous formation but

Fig. 1 • (Left) Intraoral view showing deeply imbedded cuspid, odontoma and retained deciduous cuspid

Fig. 2 • (Right) Postoperative view. Deciduous cuspid and odontoma removed to facilitate eruption of permanent cuspid

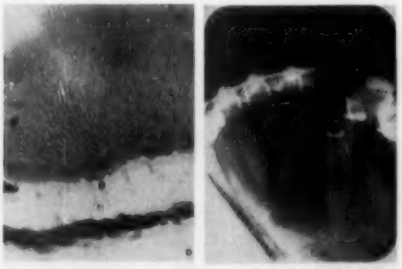


Fig. 3 • (Left) Section from odontoma, magnified 400 times, which was found to be a rather loose, myxomatous formation, but not tumorous

Fig. 4 • (Right) Region one year after operation. Cuspid has responded to orthodontic treatment and is in good position

nothing indicative of tumor tissue. One piece showed a small cyst cavity lined with irregularly placed cells, apparently dentigerous. This did not give the appearance of a tumor growth but rather of something that might be termed a retained malformed tooth. Diagnosis: unerupted tooth (Fig. 3).

Postoperative Course • The sutures were removed on the third day and the patient referred back to the orthodontist.

Comment • Postoperative roentgenograms disclosed the tooth in good position 12 months later (Fig. 4). This patient probably should have been operated on earlier and perhaps this would have been done if earlier roentgenographic examination had been made.

6381 Hollywood Boulevard

REMOVAL OF IMPACTED UPPER THIRD MOLAR

By Leonard L. McEvoy, D.D.S., Hollywood, Calif.

A 42 year old woman was referred to me by her dentist in August 1952. She had had most of her teeth removed preparatory to complete denture prosthesis. She appeared with the upper left first and second molars in position and the upper left third molar missing. The patient's general history was negative and noncontributory.

Roentgenographic Examination • Roentgenograms disclosed the impacted tooth to be in a rather unusual position. It was directly above and resting on the apexes of the roots of the second molar. The crown of the impacted tooth appeared distally and the superior portion of the tooth was apparently lying against the sinus membrane. About 2 mm. separated the crown from the hamular process (Fig. 1).

Fig. 1 • Impacted upper third molar

Operative Process • Thiopental sodium with nitrous oxide-oxygen was employed as the anesthesia. The teeth were removed which gave access to the impacted third molar. It was removed buccally and distally in an effort to retain as much as possible of the tuberosity. The sinus membrane was exposed but was not ruptured and was of normal appearance. The wound was closed with silk sutures.

Postoperative Course • The patient was given instructions routine for conditions involving the sinuses and was dismissed. She was given penicillin for three days. The healing was uneventful and on the fifth day the sutures were removed. The patient was seen a week later and referred to her dentist for the prosthetic procedure.

Fig. 2 • Teeth as they were in the mouth. There was a slight fusion of the two teeth

Comment • It is important to preserve the tuberosity region for prosthetic replacement as far as possible. It has been found of doubtful advisability to place a denture over impacted teeth, but total loss of the tuberosity presents a difficult problem in adapting a denture. This tooth was in a somewhat unusual position and it was found that there was a minor fusion between the lingual roots of the second molar and the lingual root of the third molar (Fig. 2).

6381 Hollywood Boulevard

DISPLACEMENT OF ODONTOBLASTS ASSOCIATED WITH CAVITY PREPARATION

Edward A. Marsland, Ph.D., B.D.S., and David S. Shovelton,† B.Sc., Birmingham.*

Displacement of odontoblast nuclei into dentinal tubules opened up during cavity preparation has been reported by a number of workers. The precise cause of this displacement is not yet established, although several theories have been propounded. Most of these theories can be criticized on the grounds that they offer a possible explanation of the movement of odontoblast nuclei under a particular set of conditions only. Kramer and McLean[1] described what they termed "aspiration" beneath self-curing acrylic fillings and suggested that it might be due to the exothermic reaction which occurs as the resin hardens and which expels the tissue fluid from the tubules into the pulp; as the exothermic action subsides tissue fluid flows back into the tubules and carries with it the odontoblasts. They stated that cavity linings prevent the aspiration from taking place.

Müller and Maeglin[2] associated aspiration beneath self-curing acrylic fillings with irritation of the odontoblasts by free monomer. Fischer[3] did not consider aspiration to be a specific monomer injury and suggested that mechanical, thermal or chemical injury to Tomes' fibril make it possible for the odontoblast cell to penetrate the dentinal tubule. He also suggested that increased intrapulpal pressure might force the odontoblasts into the tubules. Lefkowitz, Robinson and Postle[4] considered that displacement of odontoblasts into the dentin was evidence of excessive thermogenesis as a result of cavity preparation. Langeland[5] demonstrated that several factors, including cavity preparation, filling materials and osmosis could cause odontoblast nuclei to enter the dentinal tubules.

Fig. 1 • Hematoxylin and eosin-stained section showing displacement of odontoblasts

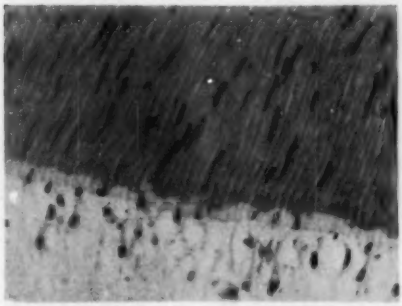


Fig. 2 • A second stained section from another tooth after cavity preparation

Swerdlow and Stanley[6] suggested that "displacement" of odontoblasts goes through several phases, beginning with part of the nucleus moving into the pulpal end of the dentinal tubule and ending with the nucleus at some distance along the dentinal tubule proper. This displacement, they considered, was not caused by the actual preparation of the cavity but coincided with the development of the inflammatory response in the damaged pulp.

Before a full understanding can be reached of the mechanism producing displacement of odontoblast nuclei beneath experimental cavities, it is essential to establish the time at which this movement of the nuclei occurs. Swerdlow and Stanley stated that "the phenomenon was not elicited during actual cavity preparation but followed it."

During the course of histological investigations by the authors into the effect of cavity preparation on the human dental pulp,[7,8] the following technic was employed. Cavities were prepared in caries-free young permanent teeth which were scheduled to be extracted for orthodontic or other purposes. A number of sound contralateral teeth in which no cavities were prepared were used as controls. Cavities were prepared using new tungsten carbide burs or diamond instruments. A range of cutting speeds was used and the actual cutting speed for each cavity was measured. To standardize conditions as much as possible, the same operator prepared all cavities, and light pressure was employed throughout. Some cavities were prepared with a coolant and some without. In all, 93 experimental teeth were investigated. Thirty-four of the teeth were extracted immediately after cavity preparation; others were retained for periods up to 129 days. Extraction

was performed using a straight elevator and root forceps so that pressure from the instruments was applied at some considerable distance from the site of cavity preparation. Immediately after extraction the apex of each tooth was carefully cut off with a saw to ensure rapid and complete penetration of the fixative solution. Serial sections were prepared of all teeth, and the distance from the deepest part of the cavity to the pulp was measured.

In many of the teeth extracted immediately after cavity preparation, odontoblast nuclei were found in the dentinal tubules which had been opened up during cavity preparation. Figure 1 illustrates part of the pulp and dentin of an upper second bicuspid tooth, directly beneath a cavity prepared without a coolant at 8,300 rpm using a cylindrical diamond instrument (diameter 1.75 mm.). The floor of the cavity was 1.4 mm. from the pulp. The odontoblast layer has almost completely disappeared and large numbers of odontoblast nuclei are seen in the dentinal tubules. Although the change was seen with some regularity in those teeth with experimental cavities, no comparable appearances were noted in the control teeth (in which no cavities were prepared).

Orban[9] has drawn attention to the movement of the odontoblast nuclei into dentinal tubules "at the spot where the beaks of the forceps act on the surface of the root." In our teeth this change was noted in addition to the effect seen directly beneath the cavity. Nevertheless we considered originally that this movement of the odontoblast nuclei beneath experimental cavities might be brought about by sudden compression and decompression of the pulp during the process of extraction. A number of cavities, therefore, were prepared in sound teeth immediately after their extraction. In all these it was found that displacement of the odontoblasts had occurred to some extent. Figure 2 illustrates the pulp and dentin directly beneath one of these cavities which was prepared without a coolant at 7,500 rpm with a no. 558 tungsten carbide bur. The changes seen are almost identical to those illustrated in Figure 1. All the stages of displacement of odontoblast nuclei noted by Swerdlow and Stanley can be seen. In view of the evidence presented, the conclusion seems inescapable that displacement of the odontoblast nuclei into the dentinal tubules beneath cavities can and does occur at the time of cavity preparation.

*Senior lecturer in dental pathology, School of Dental Surgery, University of Birmingham, England.

†Lecturer in operative dental surgery, School of Dental Surgery, University of Birmingham, England.

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Education and Knowledge • One should have education and knowledge enough so that one doesn't have to look up to people; and then one should acquire more education so that one will be wise enough not to look down on people. *M. L. Boren.*

current literature

SUBPERIOSTEAL TANTALUM IMPLANTS

By Luigi Marziani. Rev.mens.suisse odont. 69:54 Jan. 1, 1959.

The methods used for construction and insertion of implants serving as artificial denture abutments can be divided into three categories as follows:

1. Endo-osseous implants which are inserted into the natural or surgically formed sockets to serve a function similar to that of the roots.

2. Intra-osseous implants which are inserted by bone transfixion to obtain a canal which is traversed by a metal structure serving as direct denture support.

3. Subperiosteal implants which are inserted to support an already existing denture or a new denture which after an adequate healing period can be retained by protruding abutments, screws or transalveolar or circumferential wire splints.

Subperiosteal implants made of tantalum have been inserted by the author since 1952 at the Dental School of the University of Rome, Italy. Tantalum, because of its tensile strength, toughness, ductility, malleability, homogeneity, resistance to chemicals and corrosion, and tolerability, offers many advantages and, therefore, should be preferred whenever possible.

Insertion of subperiosteal implants is carried out in a two-stage operation.

The construction of subperiosteal tantalum implants requires the following procedures: (1) the wax model is mounted in an articulator; (2) the measurements of the implants are determined by roentgenography and transferred to the stone model; (3) the piece designed to become the implant structure is cut from a tantalum meshwork according to the established dimensions; (4) the position of the implant abutments are determined by a parallelometer and four holes are drilled into the stone model; (5) four pins made of stainless steel are inserted into the holes; (6) the tantalum piece is fixed to the stone model by means of the protruding steel pins; (7) the height of the implant abutments is established on the articulator according to the requirements of a balanced occlusion; (8) each implant abutment consists of a screw, a nut and a tubular pin; (9) the implant structure is sterilized with carbon tetrachloride and a 5 per cent nitric acid solution, and (10) the preparation is made on an individual impression tray.

The insertion of subperiosteal tantalum implants requires the following procedures: (1) an incision is made, the tissue is retracted and the bone exposed; (2) the bone is levelled and an artificial socket prepared; (3) the tantalum piece, without the abutments, is tested for fit and necessary modifications in shape and size are made; (4) the four holes, 1 mm. deep, are drilled into the exposed bone to receive the heads of the screws; (5) an impression, representing accurately the anatomic details of the bone, is taken by using an individual tray; (6) stainless steel pins with collars are inserted into the four holes to secure stability of the tantalum implant under pressure and to maintain parallelism of the surface around the holes through which the implant abutments will be inserted; (7) the implant—after sterilization—is inserted, and (8) after adequate wiring and fixation by screws, the position of the implant is rechecked, and the incision closed by routine suture.

This technic, different from that used for construction and insertion of subperiosteal implants made of cobalt-chromium alloys, must be learned step by step by the operators who should be encouraged to dedicate their prosthetic and surgical skill to this comparatively new phase of dentistry.

CARCINOMA OF THE BASE OF THE TONGUE

By Victor A. Marcial. Am.J.Roentg. 81: 420 March 1959.

In Puerto Rico, carcinoma of the base of the tongue is the most frequently encountered form of cancer in the oral and pharyngeal cavities, including the lip. From 1939 to 1957, 439 patients with carcinoma of the tongue were seen at the Dr. I. González Martínez Oncologic Hospital which handles about a fourth of the cancer patients in Puerto Rico; 240 of the 439 tumors (55 per cent) were located at the base of the tongue. Carcinoma of the tongue constitutes 2.2 per cent of all cancer instances in Puerto Rico. In men, the incidence is 3.3 per cent; in women, 1.2 per cent.

The maximum age distribution in the 439 patients with carcinoma of the tongue was from 60 to 64 years in men, and from 50 to 54 years in women.

The etiologic factors in over 50 per cent of patients seen in the past two years were cigar smoking and tobacco chewing. Alcoholic consumption and syphilis was noted in 11 per cent. Almost all the patients had infiltrating ulcerating lesions. Nearly 80 per cent of the tumors showed poorly differentiated to undifferentiated epidermoid carcinoma.

The most commonly encountered initial symptom was sore throat, present in 60 per cent of the patients. The pain frequently was unilateral, occurring during swallowing or aggravated by it and usually was referred to the ear. An enlarged lymph node was the chief symptom in 18 per cent. As the disease progressed, constant pain in the throat, dysphagia, pronounced salivation, bloody expectoration, dysarthria and trismus developed. The average duration of symptoms prior to diagnosis was six months.

Most of the patients had visible and palpable primary lesions. Soft tissue lateral roentgenograms of the oropharynx are helpful in determining the extent of the lesion. A biopsy of the base of the tongue may be done with the help of direct or indirect laryngscopy.

Only 18 (7.5 per cent) of the 240 patients with carcinoma of the base of the tongue showed lesions of 3 cm. or less in diameter. Two hundred and six patients (85.8 per cent) developed clinical metastases which were present at the time of admission in about 80 per cent. Except for 11 patients (4.5 per cent) with distant manifestations, metastases were almost invariably limited to the cervical region.

Until two years ago the primary treatment for most of the patients in this series was orthovoltage roentgenotherapy. For the past two years Co^{60} teletherapy has been used, and more favorable response of the primary lesion to this method has been observed. Lateral opposing fields are used, covering the enlarged lymph nodes, and a tumor dose of 6,500 r is administered in six to seven weeks. The patients tolerate the irradiation well.

Because of the extensive primary tumors present and the high incidence of metastases, the five year survival rate is poor. In this series, 135 patients were seen five years ago or longer. Of these, 36 received no therapy or only palliative treatment. Eleven patients survived five years, for a net survival rate of 11.1 per cent, and an absolute survival rate of 8.1 per cent. The average survival of 20 patients without treatment was 2.9 months with a maximum survival of 8 months.

From the data available, it appears that even patients with advanced malignant oral tumors should be subjected to treatment, because their lives can be prolonged. Early diagnosis of this accessible cancer constitutes the best hope of improving the prognosis.

PRODUCTION OF SKELETAL MALFORMATIONS IN THE OFFSPRING OF PREGNANT MICE TREATED WITH 6-AMINONICOTINAMIDE

By L. Pinsky and F. C. Fraser. Biol.Neonat. 8:106 April 1959.

The possibility that vitamins play important and specific roles in mammalian embryonic developmental processes was first suggested by F. Hale (1935) who reported that vitamin A deficiency in pregnant sows produced specific malformations in the offspring.

Studies of the types of malformations produced and of the embryo's sensitiveness to a given deficiency should provide useful information about the biochemistry of mammalian development.

The teratogenic effects of a vitamin-deficient diet can be exacerbated by adding to the diet an analogue or an antagonist of the vitamin concerned. This technic has been used successfully by combining galactoflavin with a riboflavin-deficient diet (H. Kalter and J. Warkany, 1957) and by adding a variety of folic acid antagonists to a diet deficient of folic acid (A. Giroud and J. Lefebvres, 1957).

M. L. Murphy, C. P. Dagg and D. A. Karnofsky (1957) have reported that 6-aminonicotinamide will produce a variety of skeletal malformations in the offspring of treated pregnant rats. Among the malformations were cleft lip, cleft palate, club feet, ectodactylism, syndactylia and rib anomalies.

The experimental production of skeletal malformations in the offspring of pregnant mice, treated with varying doses of 6-aminonicotinamide, was investigated at the department of genetics of McGill University, Montreal, Canada. In this experiment the use of genetically uniform animals was not considered necessary—or even desirable—and, therefore, female mice of a variety of genotypes were used. Pregnant mice, fed a stock diet, were weighed ten days after pregnancy was established and were given a single intramuscular injection of the drug, ranging from 0.4 to 0.6 mg. After gross examination of the offspring at birth, specimens were obtained, fixed and prepared for histologic study or were stained for the examination of the cleared skeleton.

A variety of malformations in the axial and appendicular skeletons was observed. Cleft palate similar to that produced by cortisone (F. C. Fraser, B. E. Walker and D. G. Trasler, 1957) and tibial anomalies were the most outstanding defects. Cleft palate occurred in 22.7 per cent of the offspring of treated pregnant mice, receiving less than 27 Gm.; and in 55 per cent of the offspring of treated pregnant mice, receiving more than 27 Gm.

It can be assumed that a single injection of 6-aminonicotinamide into pregnant mice, given on the tenth or eleventh day of gestation, induces an acute teratogenic stimulus on the developing embryo, producing developmental retardation, malformations of the axial and appendicular skeleton and an extremely high incidence of cleft palate.

The investigation produced evidence that nicotinamide plays an important role in the morphogenesis of the skeleton. There appears to be an inverse relationship between maternal weight and the effectiveness of a given quantity of 6-aminonicotinamide in producing cleft palate.

THE LACK OF CORRELATION BETWEEN THE PREVALENCE OF STAPHYLOCOCCUS SPP. IN SALIVA AND THE DENTAL CARIES EXPERIENCE IN CHILDREN

By N. E. Golsworthy. Austral.D.J. 4:112 April 1959.

The relative numbers and species of *Staphylococcus* in the mouths of two groups of children, one of which (at Hopewood House, Bowral, New South Wales) has remained remarkably free of dental caries, were investigated. Sixty-five children from Hopewood House were selected and cultures prepared from samples of activated saliva. From a large metropolitan school a group of 65 children corresponding as nearly as possible to the Bowral group in age and sex distribution was chosen, and cultures prepared from samples of saliva. The following observations were noted:

1. Species of *Staphylococcus* were present in the vast majority of the 130 mouths examined.
2. The numbers of *Staphylococcus* present varied considerably from mouth to mouth.
3. The prevalence of *Staph. pyogenes* var. *aureus* was very different in the two groups of children, being nearly four times as prevalent in the Bowral group.
4. *Micrococcus aurantiacus* and *M. candidus* were six times as prevalent in the group from Sydney than in the group from Bowral.
5. The incidence of dental caries was much less in the Bowral group.
6. Among the individual children in the Bowral group there was no apparent relation between the presence of significant numbers of *Staph. pyogenes* var. *aureus* and caries experience.
7. Between the two different groups of children there was no apparent relation between the presence of numbers of *Staphylococcus* and the caries experience.

AN INDUSTRIAL MEDICAL CENTRE

By S. Jenkin Evans. Lancet 7081:1037 May 16, 1959.

The new industrial medical center opened by Imperial Chemical Industries at its Wilton works in Yorkshire probably is the largest of its kind in the world. It serves 14,000 employees and is equipped not only for ordinary consultations and treatment, but for dentistry, roentgenology, ophthalmology, chiropody and physiotherapy.

The central waiting room has an inquiry desk from which all ambulatory patients are routed. Four dental surgeries and associated offices are located on the first floor. The full-time staff includes three physicians, a roentgenographer, a physiotherapist, two medical laboratory technicians and 11 nurses, four of whom work in shifts together with the ambulance driver-attendants to provide a continuous emergency service. Visiting ophthalmologists and an oculist operate recognized National Health Service (N.H.S.) clinics and also prescribe safety lenses provided by the company. Similarly, the dental unit operates as part of the N.H.S., being placed at the medical center for the convenience of employees who

choose to use it. At present the dental unit has one full-time dentist, but is designed for three dentists.

The medical service based on this center is essentially complementary to that of the N.H.S. Its purpose is to maintain healthy employees in a healthy environment, the emphasis being on prevention. Many treatments are undertaken at the request of consultants or general practitioners, with whom liaison is intimate and cordial. A personal medical dossier is maintained for each employee.

SYMPOSIUM ON PHONATION AND ITS RELATION TO DENTISTRY

By Michel Chateau. Actual.odontostomat., Paris 12:415 Dec. 1958.

Almost the entire December 1958 issue of the French dental journal, *Actualités Odonto-Stomatologiques,* was devoted to a symposium on phonation and its relation to dentistry. Among the participants were neurologists, psychiatrists, otorhinolaryngologists, phoniatricians and dental specialists.

The following problems were discussed and analyzed:

1. Why do certain denture types promote or produce speech defects? Which treatment procedures should be used to obtain improvement and repair?

2. Why do some children speak unintelligibly? What are the causes of these congenital or acquired speech defects? Which treatment procedures should be used?

3. Is it possible that dental or oral-surgical interventions produce speech disorders? Which preventive procedures should be taken?

Phonation is a complex phenomenon which involves the effects of various nerve stimuli on the psychic condition, especially on the neurologic conductors transmitting the stimuli to the receptors in the speech system. These stimuli govern the stream of air from the lungs to the mouth, from the mouth to the lungs, and thereby the function of the larynx in producing speech sounds. Indirectly, the tongue, teeth, cheeks and lips are involved, all of which transform the initial sounds into phonemes.

Jeanne Baruch discussed the psychologic and psychiatric aspects of the problem of phonation, especially the acquisition of speech in comparison with the child's progress in other functions, the causes and effects of delay in the acquisition of speech associated with mongolism, congenital, infantile and operative myxedemas, and encephalopathies. These diseases, either isolated or combined, produce speech defects which are difficult to diagnose by dentists. The symptoms are mental backwardness, congenital or acquired deafness, bifid tongue, audimutitas and congenital word deafness. Important psychic elements such as emotional aphasia and psychogenic mutism enter into the pathogenesis of certain speech disorders, especially the various forms of stammering.

C. Sautier expounded the neurologic viewpoints such as the importance of the various phases of progressive acquisition of speech, the activity of the cerebral regions involved in speech function and the causes of aphasia (trauma to or disease of the brain centers). The dentist should be able to differentiate between the varieties of aphasia and to make an etiologic diagnosis.

J. Bourdial emphasized the importance of using a laryngoscope for ocular examination of the larynx in instances of speech disorders. He explained the physiology of the voice according to the following recently introduced theories: (1) the myo-elastic theory assuming that the air stream coming from the lungs produces the glottal sounds, and (2) the neurochronaxy theory, claiming that the glottal sounds are produced by vibrations of the vocal cords, set up directly by nerve impulses and brought into harmony by the combined actions of supraglottal and oral components in tune with the nasal fossae. Stimuli received and sensation perceived govern the speech development. From the otorhinolaryngologic point of view, the following speech disorders should be differentiated: (1) those caused by mental deficiency; (2) those caused by failures of the air passage (poliomyelitis or after tracheotomy); (3) those caused by changes in the supralaryngeal and supraglottic cavities; (4) those caused by deafness, and (5) those caused by impairment of the laryngeal phonation organ.

Laryngoscopic examinations reveal that sudden dysphonia usually is associated with catarrhal laryngitis, influenza or infectious edema; that the progressive dysphonia is produced by pathologic alterations of the vocal cords (malignant oral tumors or tuberculosis).

F. de Huche introduced the theory of formative factors of vowels which stresses the importance of the velum in nasalization and the role the tongue, teeth, cheeks and lips play in the formation of consonants.

R. Devin stated that the problem of phonation in prosthetic dentistry is that of quality. The formation of vowels as well as that of consonants may be affected by the characteristics of dentures inserted. The resonance connected with vowel sounds requires a spe-

cific study of the dimensions or properties of the restorations, and the resonance connected with consonant sounds requires a specific study of the anatomy of the lips, cheeks and tongue during articulation. The phonetic values of a denture should be checked by a series of tests prior to insertion. If the denture should be designed to ensure correct phonation, the dimensions of the baseplates must be checked at a temperature identical with that of the oral cavity.

P. Cernea and J. C. Netter described postoperative speech defects which may be caused by (1) loss of bone tissues; (2) loss of muscular tissues; (3) cicatricial muscular adhesion, and (4) loss of osteomuscular tissues. To reduce to a minimum dysphonic postoperative effects, an immediate repair of the osseous continuity (by grafting) is indicated. Normal muscular movement should be provided because without this re-education, patients will not obtain perfect functional rehabilitation of speech.

L. Lebourg described dyslalia caused by defects of the velum and the palate (traumatism, tumors, infections, paralysis and cleft palate). Treatment consists of surgical, prosthetic and orthophonetic procedures. In severe instances, pharyngoplasty achieves the most favorable phonetic results.

All speakers agreed that the most important part the dentist can play in solving the problem of phonation consists in accurate diagnosis, competent prosthetic and orthodontic treatment and consultation with or referral to the medical specialist (neurologist, otorhinolaryngologist or phoniatrician) best suited to treat the impairment of voice or the difficulty in speaking.

PENETRATION OF TOPICALLY APPLIED FLUORIDES INTO THE ENAMEL

By O. Bock and W. Lindemann. J.dent. Belge 50:121 March-April 1959. [in German]

Newly extracted teeth, macroscopically free from carious lesions, were used to study the penetration of topically applied fluorides into the enamel, at the Dental School of the University of Erlangen, Germany.

Saliva and food particles were eliminated by thorough cleaning, the teeth were dried and partially covered with wax. They were then submerged in a 6 per cent magnesium silicofluoride solution for from 60 to 80 hours at a temperature of 37°C. Ground sections of the teeth were prepared and studied under transmitted and polarized light.

The enamel of all ground sections was examined by roentgen-ray diffraction.

With the exception of one tooth (out of 280 teeth) which showed the char..cteristic symptoms of mottled enamel, the fluoride ions in the other teeth penetrated the enamel to a depth of about 0.5 mm. In the deeper enamel layers the penetration appeared to be arrested and the fluoride ions built into the hydroxyapatite crystals. The effect of topically applied fluorides on the enamel was determined by comparing the treated and untreated (wax-covered) halves of the teeth. Roentgenographic examination of the untreated enamel structures revealed the normal hydroxyapatite network, whereas the treated regions showed a high permeation of fluorides in the surface layers and a low permeation in the deeper layers. An absolute determination of the quantity of hydroxyapatite per unit region of the ground section was not possible. The data obtained, however, gave strong indication of the mode and degree of action of the topically applied fluorides after penetration into the enamel.

BASAL CELL CARCINOMA OF THE UPPER LIP: TRANSITION FROM AN ATYPICAL ADAMANTINOMA

By G. Scarcella Perino. Arch.Ital.path. clin.tumori 2:127 Dec. 1958.

Two instances of basal cell carcinoma are reported, one occurring at the angle of the mouth and the other between the upper lip and the nose. These tumors produced ulcerations which did not heal. Surgical removal, therefore, was indicated.

Histologic examination revealed the presence of irregular masses of epithelial cells divided by a stroma of connective tissue.

In both instances the basal cell carcinoma developed from an atypical adamantinoma formed from abnormal embryonic tissue rests. Clinically and roentgenographically the adamantinoma resembled a benign cyst of the upper jaw which by transition developed into a slowly growing carcinoma of comparatively low malignancy but with a tendency to recur.

The examination of these two instances as well as a review of similar case reports in the pertinent literature proved that adamantinomas can undergo sudden malignant changes.

Although these mixed tumors may be enucleated satisfactorily at an early stage, in both instances postoperative roentgenotherapy was indicated to prevent recurrence and cervical lymph gland metastasis.

BURNING SENSATION OF THE TONGUE

By Bruno Beckmann. Zahnärztl.Rundschau 68:12 Jan. 5, 1959.

Burning sensation of the tongue, a frequent complaint of dental patients, usually is not associated with pathologic changes in the oral cavity. Frequently, it is an early symptom of severe diseases such as sideropenic dysphagia (Plummer-Vinson's syndrome), pernicious anemia, tumors of various regions (especially of the gastrointestinal tract), infestation by parasites (especially tapeworms) and avitaminosis B.

Sideropenic dysphagia is a hypochromic, microcytic anemia which is characterized by a decrease of hemoglobin in the erythrocytes. It occurs mainly in middle-aged women after severe blood loss, disturbed iron resorption caused by hypacidity of the stomach, and malnutrition. The syndrome consists of dysphagia, splenomegaly, atrophy of the mucous membranes of the oral cavity, pharynx and esophagus, glossitis and iron deficiency. One of the earliest observable symptoms of sideropenic dysphagia is a radiating burning sensation of the tongue.

Pernicious anemia is a macrocytic anemia which is characterized by a sudden reduction in the number of erythrocytes. This disease is refractory to any known treatment other than fresh blood transfusion. It is, however, not associated with infection, malignancy or malnutrition. In its early and latter stages, the disease may be associated with a concomitant burning sensation of the tongue.

Malignant tumors (especially carcinoma of the gastrointestinal tract often are associated with atrophic changes of the mucous membranes and a specific coating of the tongue. The always-present fulgurant burning sensation of the tongue may be caused by a decreased production of hydrochloric acid and an increased production of lactic acid.

Infestation by parasites (especially *Diphyllobothrium latum*, a fish tapeworm) produces bothriocephalus anemia which simulates the symptoms of pernicious anemia.

Most frequently, however, the burning sensation of the tongue is associated with avitaminoses (especially those due to a deficiency of vitamin B or B complex in the diet).

FLUORINE AND PLANT LIFE

By Erwin Aichinger. Deut.zahnärztl. Zschr. 14:389 March 1, 1959.

Although the physiology of cultivated plants is a subject which scientific research has hardly touched, experiments were carried out at the Institute of Applied Plant Sociology in Klagenfurt, Austria, to establish whether the fluoride requirements of man could be supplied by plants containing fluorides.

One hectare (2.471 acres) of excellent arable soil was fertilized with 10,000 kg. floating lime containing 14.26 per cent calcium fluoride. Spinach grown in this field contained 4.113 ppm fluoride (the stems, 4.205 ppm, and the leaves, 6.704 ppm) whereas sugar beets, oats and grass had hardly any fluoride content. It can be assumed, therefore, that about 60 Gm. of this spinach can supply the daily fluoride requirement of children.

Our studies were in no way intended to promote fluoride fertilization as a means to replace fluoridation, but in regions where the artificial enrichment of drinking water by adding 1 ppm fluoride meets difficulties, the caries-reducing intake of fluoride by a nutrition consisting partly of fluoride-containing plants should be investigated further as a supplementary procedure.

Investigations by K. E. Quentin and S. Gericke have revealed that the presence of fluorine ions in the arable soil promotes a favorable condition for growth of vegetables and grains (oats, rye and wheat) by constructive symbiosis between the bacterial flora in the soil and the cultivated plants.

book reviews

THE CHEMISTRY OF DRUGS

By Norman Evers, Ph.D. and Dennis Caldwell, Ph.D. Third edition. 415 pages. Index. $12.25. New York, Interscience Publishers, Inc., 1959.

This book is divided into two parts, "Synthetic Drugs" and "Naturally Occurring Drugs." In the first part, the chapters have therapeutic titles, such as "Anesthetics" and "Antimalarials." The second part is organized on the basis of chemical nature and source, as, for example, "Curare Alkaloids," and "Hormones of the Adrenal Cortex."

Each chapter consists of a brief introduction, a series of monographs with structural formulas, methods of preparation, and statement of properties, and a list of references to the chemical and patent literature. Almost no reference is made to structure-activity relationships or to pharmacology, and only occasional mention of therapeutic applications appears.

The authors have handled their subject matter well. As might be expected, some of the most recently introduced drugs, such as propoxyphene, are not described, and some drugs which are of interest primarily in dentistry, such as propoxycaine and nordefrin, have been overlooked.

The only illustrations are the structural formulas, which are adequate. The type is small and the pages are crowded, but otherwise the book is very readable. Appendixes facilitate interpretation of the British nomenclature which otherwise might be confusing to an American reader. The paper and binding are fairly good.

The book is most suited to the needs of the pharmacist, drug chemist or pharmacologist. It should also, however, be in the libraries of all dental and medical schools and research institutions. *Donald A. Wallace*

DENTAL CLINICS OF NORTH AMERICA—INTERRELATIONSHIP OF ORAL AND SYSTEMIC DISEASE

By Lester W. Burket, D.D.S., M.D., consulting editor, in collaboration with 24 co-authors. Three issues yearly. July 1958 issue. 270 pages with illustrations. Index. $14 yearly subscription. Philadelphia, W. B. Saunders Co., 1958.

As a part of a continuing symposium on varied dental topics, this volume carries on the excellent high standards and presentation of practical information. Dr. Burket states in his foreword; "The interrelationships between oral and systemic disease are many and significant, as the different articles in this volume will indicate. They should be recognized and understood by both the dentist and physician."

Never before have so many authors combined their abilities and experiences in the preparation of a single volume dealing with this important topic. The 19 contributions by 25 individuals represent outstanding medical and dental investigators, teachers and clinicians.

It is quite impossible in the limited space allotted, to review this book chapter by chapter. Suffice it to say, the material is enjoyable to read and review. The subject matter is well organized and arranged, so that specific information can be found easily. The text is presented in such a manner as to motivate those unfamiliar with the subject to become interested because of its clarity, simplicity and choice of topics. Most books which include subject matter of this sort fall short of their goal, by being either too technical or too simple.

The size and format of this book are the same as previous volumes in this series. In addition to some excellent illustrations, a small

number of clear illustrative diagrams and color plate, a general index and many pertinent references are included.

This symposium should command the interest of any dental or medical clinician or investigator. These summaries provide knowledge of such value as to justify the acquisition of the book for those who want up-to-date information with a minimum expenditure of time.

E. Alan Lieban

THE FAMILY MEDICAL ENCYCLOPEDIA: THE NEW STANDARD AND COMPLETE REFERENCE BOOK OF MEDICAL CARE FOR THE ENTIRE FAMILY

By Justus J. Schifferes. 617 pages with 67 illustrations. Index. $4.95. Boston, Little, Brown & Company, 1959.

Although Dr. Schifferes, a director of the Health Education Council and author of several books such as *The Autobiography of Science, Essential of Healthier Living, How to Live Longer, Science Through the Ages* and many others, has designated this comprehensive medical encyclopedia primarily for use by the laity, many of its 2,400 entries will be of interest and value to dentists, physicians and other specialists in the health field.

The advisory board obviously consisted of physicians and dentists prominent in their specific fields.

The concise index and the alphabetic arrangement make it easy for the reader to find almost any reference on the problems pertaining to health, disease, infant and child care, and first-aid procedures.

Advice and information on such subjects as care and functioning of the human body, health in childhood and old age, health and hospital insurance, diet (with a table of *Daily Dietary Allowances,* recommended by The Food and Nutrition Board of the U. S. National Research Council) and physiologic as well as psychologic health care are dealt with in a manner seldom encountered in textbooks or reference works. The sections pertaining to dental health are interestingly written and cover the principal aspects satisfactorily. In general, the text is well written and excellently illustrated (artistic drawings by Louise Bush).

This book can be regarded not only as a simple and comprehensive guide to health, dental and medical care but also as an appropriate addition to the libraries of public schools and of dental practitioners.

Paul H. Glucksman

CLINICAL DENTAL HYGIENE

Edited by Shailer Peterson, M.A., Ph.D., with eighteen contributors. 348 pages with 161 illustrations. Index. $6.75. St. Louis, C. V. Mosby Co., 1959.

This book, consisting of 12 chapters plus a glossary, is well-written and illustrated. It covers all of the essentials necessary for the practice of dental hygiene, in a well-organized and logical sequence. The book should be valuable not only to the student enrolled in a dental hygiene program, but also to the hygienist in practice. It should also be a valuable reference book for the girl in college or high school who is considering dental hygiene but is uncertain as to the nature and scope of dental hygiene.

Starting with the relationship of the dental hygienist to the dental health team, the various chapters cover such topics as the role of the hygienist in the patient-dental health team relationship, the need for general education as well as basic science education, oral prophylaxis, deposits on teeth, instruments and chair-assisting, dental materials, dental roentgenology, histories and charts, sterilization, appointments and recall, and preventive dentistry. Each chapter is followed by a number of references and a list of review questions.

The book is easy to read, in both style and type, and is printed on good quality paper. It is highly recommended for all who have an interest in the field of dental hygiene.

John Victor Olson

VADEMECUM DER MUNDKRANKHEITEN (VADEMECUM OF THE DISEASES OF THE ORAL CAVITY)

By Dr. Med. Theodor Port. 135 pages. Detailed table of contents. Index. München, Richard Pflaum Verlag, 1959.

As small as the volume seems to be, there scarcely exists a more comprehensive manual of oral diseases and their relationship to general pathology. The author does not claim to have written a textbook. His idea was to provide the dental practitioner with help in diagnosing a disease by determining from the symptoms and from the history the cause, course, differential diagnosis, prognosis and therapy. In addition, he intends to give the student a compendium which will enable him to acquire easily sufficient knowledge for his final examinations in "oral medicine." And—last but not least—the book is intended to be a diagnostic adviser to the physician, covering many fields of general pathology.

The author has not only kept his promises but he has provided the profession with a tool whose value exceeds by far that of an extensive textbook. Every disease is discussed as briefly as possible. The discussions are precise, well coordinated and comprehensive. Up to a short time ago, Professor Moral's *Clinic Of Dental And Oral Diseases* has been one of the leading textbooks in this field in the German language. It was outstanding inasmuch as Moral presented actual cases—discussing them with the reader. Port's *Vademecum,* although quite different in its make-up, seems to be as outstanding a presentation as the former one, especially so in those areas which are reaching out into the field of general medicine. It would not be surprising if this book, translated into the English language, finds its way to the desk of many a practitioner in this country.

Although small in print and type, these factors can be excused, even praised, as they contribute to the fact that the book represents a real "vade mecum" and a companion inside and outside of the office. *Paul M. Doctor*

RAPPORTS ET COMMUNICATIONS DE XVieme CONGRES DE L'ASSOCIATION POUR LES RECHERCHES SUR LES PARODONTOPATHIES (ARPA INTERNATIONALE)

286 pages. Librairie de l'University, Geneve, Georg & Cie, 1958.

This book presents 47 papers on periodontal disease presented at the fifteenth meeting of the Arpa Internationale. The reports are written in English, French, German or Spanish, with summaries in at least two languages. Five papers are by individuals from the United States. It is interesting to note that among the many subjects covered, geriodontics, nutrition, the bone factor in periodontal disease, systemic disease and the periodontium, and endocrine dysfunction receive increased attention.

One interesting study on the epidemiology of periodontal disease is also presented. Other papers discuss treatment with emphasis on functional, orthodontic, surgical and prosthetic aspects. In basic research, the papers of Frank and others on the submicroscopic structure of normal bone and in periodontal disease are particularly noteworthy. An interesting work on tropical pathology and its relationship to periodontal disease, namely gingivitis and stomatitis, is presented by Harter. Petrovic approaches periodontal disease from a biochemical point of view. He shows, in experiments with animals using radioisotopes, that ribonucleic acid and dexosyribose nucleic acid are decreased in periodontally diseased tissues.

All the papers are short and concise and present a minimum of diagrams and illustrations. The bibliographies of most papers are adequate. The summaries in foreign languages or English are complete enough for one to gain a working knowledge of the author's contribution. Style and type size are excellent.

The work is invaluable for the specialist interested in the present status of periodontal research and treatment in Europe; the general practitioner will gain up-to-date information of the present status of periodontal therapy. *Ernest Baden*

PATHOLOGIC PHYSIOLOGY OF ORAL DISEASE

By R. W. Tiecke, O. H. Stuteville and J. C. Calandra. 480 pages with 637 illustrations. Index. $11.50. St. Louis, C. V. Mosby Co., 1959.

The authors present a wealth of material on oral diseases in the hope of increasing knowledge of and preparedness for prevention and treatment of these conditions by dental students and dentists.

The book consists of 26 chapters covering practically all of the diseases with oral manifestations. The style of writing is good, but assumes prior knowledge by the reader, tending to follow the pattern of the clinicopathological conferences from which the book is a product. Apart from a few chapters, almost all diseases are discussed under the following headings: etiology; clinical features; histopathology, and treatment. Each of these categories suffers from lack of substance in one disease or another; however, the coverage of the more common oral disorders is done with clarity. Considerable space is devoted to early changes in the oral tissues as well as oral neoplasia. This is of considerable assistance to the dentist in his role as a diagnostician. The section on "normal" values serves as a ready reference for those not familiar with such information. The tables at the end of certain chapters serve as useful summaries and quick reference for differential diagnoses.

The authors have attempted to put into book form the case presentation method of teaching. The greatest handicap is the wealth of information and visual aids in some diseases and the lack of one or the other, or both, in a number of other instances. The histopathologic descriptions are often unusually

short and terse to the point that they are likely to be meaningless unless the practitioner has brushed up on his pathology. The clinical pictures (black and white) are good, but the book would have been greatly helped with a more critical selection and use of color. The pictures of tissue sections are disappointing and could have been eliminated; no magnifications are given and often one cannot make out the cells. The chapter on dental caries is very poor and the chapter on "Biopsy and Laboratory Tests Useful to the Dentist" makes no mention of serologic or microbiologic tests.

The book is best used as an aid in diagnosis and review in clinical teaching; it will not serve as a basis for the development of concepts.

Ned B. Williams

SCHWEIZERISCHES MEDIZINISCHES JAHRBUCH 1959 (SWISS MEDICAL YEARBOOK 1959)

Edited by Otto Leuch, M.D., and H. Egli, LL.D. 554 pages with 30 illustrations. Index. Swiss francs 16.50. Basel, Benno Schwabe & Co., 1959.

In the recent issue of this yearbook, the material on the practice of general and specialized medicine (including dentistry and its specialties, pharmacology and veterinary medicine) in Switzerland is well organized and easy to use.

The first part consists of biographies of prominent Swiss scientists, a complete index to the Swiss medical and dental literature published in 1958, and three original articles: (1) "New Clinopathologic Ideas," by W. Löffler; (2) "Recently Developed Anesthetics, Sedatives and Hypnotics," by M. Bleuer and P. Waser, and (3) "Disturbances of the Carbohydrate Metabolism in Children," by E. Rossi.

The second part contains the directories of physicians, dentists, pharmacists and veterinarians, arranged geographically and alphabetically.

The third part contains a list of medical and dental educators, schools, hospitals and professional organizations.

The fourth part is devoted to federal and cantonal bureaus and offices associated with public health and social welfare.

The fifth part lists Swiss spas, educational institutes, homes for children and for aged people, and pharmaceutical preparations (and their indications).

The book is well written, attractively bound, excellently illustrated and printed. It can be recommended to practitioners and students who are interested in the present state of the health services in Switzerland. Because it is a useful reference work, this book should be in all medical and dental libraries.

Paul H. Glucksman

AN INTRODUCTION TO PERIODONTIA

By Henry M. Goldman, Saul Schluger, D. Walter Cohen, Bernard Chaikin and Lewis Fox. 346 pages with 180 illustrations. Index. $7.75. St. Louis, C. V. Mosby Co., 1959.

Written for both dental students and the man in general practice, this new compact book contains 16 well-illustrated chapters.

The authors have presented their material in an excellent sequence of complete step-by-step procedures reflecting the thought, experience and planning that went into postgraduate dental lecture series.

This book provides the basic background, fundamentals and easy-to-read therapeutic and operative procedures of virtually all well-established phases of periodontics.

The text contains a particularly useful core of information for the general practitioner who wishes to familiarize himself with a greater knowledge of the problems and practice of periodontics. There are brief hints of more complex material and procedures which should serve the purpose of stimulating the reader to increased interest and further investigation of the subject.

The ever-increasing demand of the public for periodontal treatment must be met by the general practitioner and this well-organized, compact text will serve most adequately as a modern clinical guide book to achieve this end.

E. A. Archer

ANESTHESIA ABSTRACTS (VOLUME L)

By John S. Lundy and Florence A. McQuillen. 293 pages. $4. Minneapolis, Burgess Publishing Company, 1959.

This is the fiftieth volume of a well-known series. There is no better way of maintaining contact with the anesthesia literature than to read each succeeding volume of *Anesthesia Abstracts*.

This volume contains 250 abstracts of articles of interest to the anesthesiologist, and includes a comprehensive cumulative index of references from Volume XLI through the present edition.

Volume I of this series appeared in 1937. In the following 22 years, the authors have

compiled a total of 12,500 abstracts. This compilation of material demonstrates well the amazing progress that has taken place in anesthesiology in less than a quarter of a century.

Dr. Lundy is regarded by many as the "dean" of medical anesthesiologists and Miss McQuillen as the foremost nurse anesthetist in the country.

The book contains an excellent index of authors and subject matter. It is mimeographed and attractively bound.

Bruce L. Douglas

CONDUCTION INFILTRATION AND GENERAL ANESTHESIA IN DENTISTRY

By Mendel Nevin, D.D.S., Marshall I. Nevin, M.D., F.C.C.P., and Julious Roy Bourgoyne, D.D.S. Sixth edition. 392 pages with 240 illustrations. Index. $8.50. Brooklyn, Dental Items of Interest Pub. Co., 1959.

This is the twentieth printing of this book since its publication in 1923 by the original author, Mendel Nevin. This edition is the first to be published since his death. In the preface to this book, written by Dr. Nevin's son, he states, "Since the first publication, this book has sold nearly 50,000 copies, including several editions in foreign languages." It seems clear that the revision of a book with such a record, using the structure and the material which in the main is still sound, and adding or deleting in areas where progress in dental anesthesia makes it advisable, would add significantly to the literature of dentistry.

A useful addition to the book is a large detailed chart of the trigeminal nerve which would be suitable for framing and could be removed from the front cover without damage to the book. All previous editions of this book have had clear informative illustrations. In the present edition many of the illustrations have been redrawn or replaced with what the authors considered better ones.

The table of contents has been improved by the use of bold face type for chapter headings and a detailed listing of subjects included in each chapter. Five anesthetic drugs, not in use when previous editions of this book went to press, are described. Each of these drugs is evaluated as to its effectiveness and toxicity. The section of the book concerning general anesthesia has been completely rewritten by Dr. Bourgoyne.

It seems that the authors have completely revised this book on dental anesthesia which has gone through many printings and editions, and has been an unusually popular book on the subject. By so doing they have produced a book which should be widely accepted by the dental profession.

Warren R. Schram

SCHULÄRZTLICHE FRAGEN

(PROBLEMS IN SCHOOL MEDICINE)

Edited by Otto Schmith. 197 pages. DM. 12. Stuttgart, Georg Thieme, 1957.

The editor of this rather small booklet, the sixth of a series on public health, published by the German Ministry of Interior, Department of Public Health Services, states that the material is planned for those physicians, medical assistants and teachers who work in medical clinics attached to the elementary schools of municipal school systems.

The chief aim of this booklet, however, seems to be to provide information on public health procedures applicable more to general health education than to the clinics themselves. School dentistry, and all problems arising in this field, are omitted.

The dependency of health education and physical training on each other and on other school or community activities is stressed constantly, as well as the relationship between physicians and teachers in regard to school medical clinics and health education.

The material presented is practical and in accord with the customary interprofessional thinking of medicine and education on the administration of health education. The booklet could be used as a help in professional preparations of teachers and school administrators as well as for physicians serving public schools as medical advisers or members of educational boards. The text, however, contains little that is new or of interest for dentists serving in similar capacity.

Paul H. Glucksman

DENTAL BIOGRAPHICAL SKETCHES

By A. Porter S. Sweet, D.D.S. 33 pages. Bibliographies. $2. Pittsford, N.Y., The Naportan Co., 1959.

Dr. Sweet has collected 26 of the brief biographies of outstanding persons related to dentistry which have appeared since 1946 on the inside front cover of *Dental Radiography and Photography*. Although these sketches do not present any new information, the selection of dentists whose lives are recorded is excellent and the collection within a single cover is convenient. Like all of Dr. Sweet's illustrations, the portraits are good.

ESSENTIAL PRINCIPLES OF PATHOLOGY

By John W. Landells, M.A., M.S., M.R.C.P., F.Z.S. 278 pages with photomicrographs. Index. $5. Great Britain, Pitman Medical Publishing Co., Ltd. 1959.

In his introductory remarks, Dr. Landells states: "This book is designed primarily for the medical student at the start of his clinical course." The author makes no claim that the text is an exhaustive or critical review of the subject. He attempts merely to relate the existing pathologic conditions to the most common conditions that the student will encounter in his ward rounds.

The text is divided into eight chapters: (1) Introductory; (2) The sources of pathological information; (3) Inflammatory responses; (4) Abnormal inflammation; (5) Mechanical breakdown of transport within the body; (6) Disease due to deficiencies and excesses; (7) Disorders of growth, and (8) Disorders associated with reproduction.

This compact, well-prepared, simple textbook is written in an easily readable style, in plain, effective language. It presents an organized and rational approach to pathology in a practical manner. A wide range of subjects is covered.

The book is bound nicely. The format, print and quality of paper are good. The reference lists are brief, but chosen wisely. It does not appear to be a practical textbook for dental students or dentists, except as a background reference for certain specific subjects.

E. Alan Lieban

A SYNOPSIS OF ANAESTHESIA

By J. Alfred Lee, fourth edition. 578 pages with 72 illustrations. Index. $6.50. Baltimore, Williams & Wilkins Co., 1959.

Dr. Lee's fourth edition is a complete revision of his previous editions and although still titled "A Synopsis of Anaesthesia" gives a rather thorough coverage of the field by concentrating on essential material. In this manner the author has managed to include much auxiliary and related information.

On cursory examination it may be difficult to see how the subject matter in the 33 chapters could be covered adequately. A more thorough perusal of the book uncovers the expansive detailed material it contains. By eliminating unnecessary and voluminous detail and presenting material in a logical sequence this text is easy to read and becomes a ready source of information.

Adequate space is devoted to the basic sciences as they apply to anesthesia, resulting in a sufficient coverage of the anatomy and physiology of respiration, circulation and the nervous system. The pharmacology of the anesthetic agents as well as related drugs are included and it is gratifying to note the number of drugs discussed. The chapters devoted to pharmacology are particularly good as they include the actions and indicated uses of the various drugs. Many of the newer drugs such as the muscle relaxants and the ataraxic drugs are discussed.

The technical aspects of anesthesia are covered briefly but thoroughly with the stages and signs of anesthesia outlined in a clearly understandable manner. Recent variations from Guedel's classic stages are pointed out and explained.

Although some chapters, particularly those relating to anesthesia for general surgical procedures, spinal anesthesia, bracheal plexus blocks, cervical plexus blocks, and so forth, may not be applicable to the dentist interested in anesthesia, the majority of them would be useful.

Dr. Lee's text, because of the vast amount of material included, could be recommended for experienced anesthetists as well as students, and although much of it is not applicable to dentistry, the dentist interested in anesthesia could gain a great deal from this book.

Leonard M. Monheim

MEDIZINISCHE DEMOGRAPHIEN WESTDEUTSCHER STADT- UND LANDKREISE (MEDICAL DEMOGRAPHY OF WEST GERMAN URBAN AND RURAL DISTRICTS)

By Friedrich Koch. 121 pages. DM. 7.50. Stuttgart, Georg Thieme, 1957.

This booklet is the fifth of a series on public health, published by the German Ministry of Interior, Department of Public Health Service. Basing his text on vital statistics, the author, the head of the governmental health agencies, reports on the health conditions observed in various urban and rural districts of West Germany. He seems to be mainly concerned with technics and procedures for improving the quality of school health programs; he neglects, however, the significance of dental health in general and school dental service in particular.

There is sufficient detail included to give the monograph usefulness for both the teacher and the public health officer who wish to improve their skills in health education. It is regrettable, however, that the author, will-

ingly or unwillingly, omitted the problem of dental health and neglected also to provide a subject index and a bibliography.

Paul H. Glucksman

LABORATORY MANUAL OF BIOLOGICAL CHEMISTRY FOR STUDENTS OF DENTISTRY

By Walter C. Hess and Joseph C. Muhler. 118 pages with 3 figures. $2.25. St. Louis, C. V. Mosby Co., 1959.

Twenty-eight assignments are presented for a laboratory course in biochemistry. This small volume is very simply written. All instructions as to what to do and how to do the experiments are clear enough to allow even a poor student to perform all the work. Unfortunately, it is so clear, so complete in detail, that the authors leave no opportunity for any thinking on the part of the student. A student could easily carry out each experiment without understanding what he has done.

A too-brief theoretical introduction to each exercise is offered at the start of each chapter.

The book is extremely well-suited for a beginning biochemistry course, but does not offer either student or instructor any material advantage over the many other published biochemistry laboratory manuals. However, the last seven exercises should be very useful to biochemists engaged in dental education, as they include experiments using saliva and teeth. There are five assignments devoted to saliva, including chemical composition of saliva, Fosdick's caries susceptibility index, salivary acidity and ammonia, and the carbon dioxide combining power. These are followed by qualitative analysis of teeth and the effect of fluorides on the acid solubility of dentin.

Henry Jeffay

PARTIAL DENTURES

By Merrill G. Swenson, D.D.S., and Louis G. Terkla, D.M.D. Second edition. 389 pages with 403 illustrations. Index. $10.50. St. Louis, C. V. Mosby Co., 1959.

This book, consisting of 27 chapters divided into two parts, is plainly written in a fluent style and beautifully illustrated with photographs and line drawings.

Part 1 deals with related factors and fundamentals of partial denture construction and covers, among other things, diagnosis, prognosis, treatment planning and design. It also contains an excellent chapter on the correction of interceptive occlusal contacts in centric relation of natural teeth. Part 2 is a chronological step-by-step procedure for removable partial denture construction.

Because it is so well illustrated this book may be of value as a text or reference in the undergraduate curriculum. A complete omission of precision attached removable partial dentures is noted, and except for this area the subject is excellently covered. The glossary is quite complete and its inclusion in the book should aid in the standardization of prosthodontic terminology. *Monte G. Miska*

PRACTICAL ORAL SURGERY

By Henry B. Clark, Jr., M.D., D.D.S. Second edition. 469 pages with 509 illustrations. $9.50. Philadelphia, Lea & Febiger, 1959.

This revision of a text on oral surgery was prepared with the intention of providing a concise presentation of the fundamentals of the subject with inclusion of the important rapid and profound changes in medicine, dentistry and surgery effecting improvement and refinement in the art and science of oral surgery. The material, placed in reasonably proper category, is introduced by several preliminary chapters that are pertinent to the whole field. This introduction to oral surgery, covering more than an ample share of the total text, deals with such subjects as, definition and objectives of undergraduate study, physical examination and laboratory data, indications for surgery and selection of patients, and a brief review of systemic diseases that influence the management of the surgical patient.

Oral surgery *per se* is introduced by a detailed, but elementary, description of instruments used for exodontic procedures, and is followed by chapters on sterilization and what the author describes as the "seven minimum essentials" for oral surgical procedures. The seventh chapter is titled, "Basic oral surgical technic," and is divided under three headings termed, "Soft tissue surgery," "Hard tissue surgery" and "Combined hard and soft tissue surgery." The descriptions of technic are confined primarily to the removal of teeth and alveolar process disease. Oral tumors are reviewed, following a brief consideration of postoperative care. The discussion of tumors is in broad generalities and is practically devoid of surgical management. There is moderate review of the surgery of deformities, but insufficient to be of practical value to the surgeon seeking a guide for specific technic. Considerable space is devoted to the surgery of injuries, and the subject of infection is comprehensively covered.

Under the chapter, "Miscellaneous oral surgical operations," only dental transplantation and implant dentures are mentioned, and the final chapters are devoted to "Drugs," "Hospital practice" and, "The art of practice."

It is obvious that the author intended this as a text for the undergraduate student and the completely uninformed general practitioner, as the practitioner above this level will find but little of practical value or theoretical interest within its contents. In general, it is a superficial résumé of certain aspects of oral surgical practice, presented in a very elementary fashion with unnecessary inclusion of basic sciences at the expense of complete oral surgery discussion and descriptions. The material provided hardly justifies the revision of the first edition. *Herbert J. Bloom*

TEXTBOOK OF MICROBIOLOGY

By William Burrows, Ph.D., with the collaboration of Richard Janvier Potter, Ph.D., and James William Moulder, Ph.D. Seventeenth edition. 954 pages, 301 figures and numerous graphs and schematics. Index. $14. Philadelphia, W. B. Saunders Co., 1959.

This edition represents a revision and enlargement of a well known and accepted book in the broad field of microbiology. The 40 chapters of well-illustrated material makes an excellent text and reference book for the serious student, and it is designed to fit the needs of those majoring in this field as well as medical students studying microbiology as part of their specialized curriculum.

Improvement in the handling of many sections, as compared to the previous editions, is readily seen, starting with an enlarged and more interesting treatment of the historical developments of microbiology and continuing on through the sections on mycology, rickettsia and viruses. The subject of bacteriophage, however, is no longer handled in a separate chapter, but the material is now discussed under the sections on the structure of the microbial cell and the growth of microorganisms. The chapter on bacterial physiology has been changed in certain places so that the known metabolism of some microorganisms is presented in all of its chemical complexity. The sections on disinfection, antibiotics and chemotherapy are presented in good fashion.

The chapters covering infectious diseases and invading microorganisms are well written and cover the subject very adequately. The sections on immunology, however, are traditional in their approach, bypassing for the most part the blood groups and their immunological problems and the newer findings on such important subjects as "auto-immune" diseases. The references used in this revision tend to lean more heavily on review articles than on original source material.

The problems of oral diseases and oral manifestations of infectious diseases are only covered lightly, thus limiting this excellent book's usefulness in the special problems of dentistry. *Sol Haberman*

ANATOMY AND PHYSIOLOGY

COLLEGE OUTLINE SERIES, VOLUME I

By Edwin B. Steen, Ph.D., and Ashley Montagu, Ph.D. 332 pages with 103 illustrations. Index. $2.50. New York, Barnes & Noble, 1959.

This is the first half of an ambitious project aiming at a condensation of human anatomy and physiology for review and correlative study —chapters on cells, tissues, integument, skeletal anatomy, muscular anatomy, digestive anatomy, blood, lymph and circulation are included. Two valuable helps for the college student are placed before Chapter 1: a tabulated bibliography, covering each of the well known college texts in anatomy and physiology, and a quick reference table based on the same nine works. The extensive experience and scholarly training of each of the authors is reflected in the orderly and readable manner of positioning of a great volume of material within a small compass. The illustrations and diagrams are, for the most part, original. Tables have been used effectively at many points. The book seems altogether worthwhile as an adjunct to study in its field. *John A. Cameron*

WATCH YOUR LANGUAGE

By Theodore M. Bernstein. 276 pages. Preface by Jacques Barzun. Appendix. Index. $3.95. Great Neck, N.Y., Channel Press, Inc., 1958.

Writers, editors, and particularly those who have been instructed and delighted by the "Winners & Sinners" bulletins on better English prepared for the *New York Times* news staff by Mr. Bernstein, will welcome publication of this book, based on those bulletins. Subtitled "a lively, informal guide to better writing . . . ," this book is presented as a writer's guide to economical, accurate, vivid writing.

The five chapters have the following titles: "Words that need watching"; "Storytelling";

"Syntax sinners"; "Helpful hints for hatchet men," and "Head-hunting." An appendix contains nine news stories from the *New York Times* that illustrate some of the points made in the book.

Dental journalism would be measurably improved if every dental writer and dental editor observed the strictures so entertainingly supplied by Mr. Bernstein. This book belongs in the dental editor's office, together with the unabridged *Webster's*, Fishbein's *Medical Writing*, Denton's *Vocabulary of Dentistry*, and Dorland's *Medical Dictionary*.

Incidentally, "Winners & Sinners" is "a bulletin of second-guessing issued occasionally [every two or three weeks] from the southeast corner of the *New York Times* news room." The smart editor will try to get on the mailing list.

N. C. Hudson

DENTAL CLINICS OF NORTH AMERICA—JULY 1959

SYMPOSIUM ON INTERCEPTIVE ORTHODONTICS

By T. M. Graber, D.D.S., Ph.D., consulting editor in collaboration with 11 co-authors. 168 pages with illustrations. Index.

SYMPOSIUM ON PROBLEMS OF ORAL AND FACIAL PAIN

By R. Gordon Agnew, D.D.S., Ph.D., consulting editor in collaboration with 12 co-authors. 141 pages with illustrations. Index. These two subjects are contained within the July edition. Three editions published yearly. March, July and November. Total price, yearly subscription, $14. Philadelphia, W. B. Saunders Co., 1959.

INTERCEPTIVE ORTHODONTICS

The authors selected to prepare the various sections are among the outstanding authorities in their respective field. They have presented their topics in a clear, concise and informative manner. Each chapter is well arranged, and terminates with a conclusion or summary. With but one exception, all have a bibliography appended.

It is difficult to compare this work with any other, since it is unique in its comprehensiveness, and in the abundance, clarity and general excellence of its illustrations. Each chapter is well written.

This symposium is not meant to be an exhaustive treatise, but rather to present material that the general practitioner might better cope with in orthodontic problems that may arise in daily practice. The methods and lucidity of presentation enable even those with a very limited knowledge of orthodontics to understand the text.

Dental practitioners and dental students should find this compilation profitable and enjoyable.

PROBLEMS OF ORAL AND FACIAL PAIN

The editor has done an excellent job of assembling the material and presenting it in the form of a coherent text. Contributions of this sort are bound to be useful. This symposium is in the nature of a brief synthesis, reflecting current thinking about oral and facial pain, from the viewpoint of some of the important developments in the past. The problems discussed are covered thoroughly, with the inclusion of more than one solution in most instances. The various authors are men of wide experience in the medical and dental fields. They describe very aptly the areas of pain involvement of vital concern to the dentist and the therapeutic management.

To quote Harry Sicher, one of the co-authors: "To diagnose the source of pain, to relieve pain, to prevent pain during treatment—these are three ever-recurring problems in dentistry." This is the sum and substance of this compendium.

Aside from being illustrated liberally with excellent reproductions, including both photomicrographs and line drawings, the text is well indexed and contains an up-to-date list of references on all the various aspects of the problem of oral and facial pain.

This work is highly commendable, not only for the dental practitioner or dental student, but also for the interest of physician, medical student or intern who wishes to acquire a better understanding of oral and facial pain.

E. Alan Lieban

Beck, Matthew, New York; College of Dental and Oral Surgery, 1921; died July 2; age 60.

Bellomo, Sal J., Los Angeles; University of Southern California School of Dentistry, 1949; died July 18; age 37.

Best, Robert H., Chicago; Chicago College of Dental Surgery, 1921; died June 19; age 69.

Caccamise, James H., Jamestown, N. Y.; University of Buffalo School of Dentistry, 1922; died July 14; age 59.

Carmean, Clyde C., Santa Cruz, Calif.; University of California College of Dentistry, 1918; died February 9; age 63.

Carter, Carl C., McLouth, Kan.; Kansas City Dental College, 1918; died July 18; age 72.

Clemo, Clarence J., Highland Park, Mich.; University of Michigan School of Dentistry, 1920; died July 31; age 64.

Cobb, Frederick E., Minneapolis; University of Minnesota School of Dentistry, 1895; died August 5; age 92.

Costenbader, John H., Norfolk, Va.; University College of Medicine Dental Department, 1899; died May 10; age 83.

Courtney, Stanley N., Keokuk, Iowa; University of Iowa College of Dentistry, 1943; died July 6; age 40.

Curtis, Leslie S., Edgemont, S. D.; Creighton University College of Dentistry, 1925; died June 17; age 57.

Doherty, Roderick W., Milwaukee; Marquette University Dental School, 1925; died July 12; age 58.

Ellis, William H., Lander, Wyo.; Northwestern University Dental School, 1902; died June 7; age 84.

Favero, Edward, Queens Village, N. Y.; University of Pennsylvania School of Dentistry, 1917; died July 31; age 64.

Field, Roger C., Kansas City, Mo.; Kansas City Dental College, 1897; died June 6; age 86.

Gardner, Robert C., Long Beach, Calif.; Chicago College of Dental Surgery, 1888; died July 15.

Getchell, Robert E., Waltham, Mass.; Tufts College Dental School, 1916; died July 13; age 72.

Gresens, Henry L., Toledo, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1934; died June 17; age 55.

Hall, Robert C., Toledo, Ohio; University of Michigan School of Dentistry, 1909; died June 23; age 75.

Harriman, Edward V., Bryan, Texas; Columbian Dental College, 1898; died April 12; age 92.

Hatton, Edward H., Evanston, Ill.; died August 15; age 84.

Helland, Carl A., Argyle, Wis.; Marquette University Dental School, 1908; died May 2; age 77.

Hurlstone, Frank J., Chicago; Northwestern University Dental School, 1918; died August 7; age 66.

Hutchason, Willis E., Los Angeles; Indiana Dental College, 1894; died July 24; age 89.

Jacobi, Albert F., Clinton, Iowa; University of Iowa College of Dentistry, 1935; died July 9; age 48.

Jarrett, Ralph F., Charlotte, N. C.; Atlanta-Southern Dental College, 1921; died July 11; age 61.

Jenner, David, Hollywood, Calif.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1927; died July 7; age 63.

Johnson, Otto M., Chicago; Northwestern University Dental School, 1923; died July 28; age 63.

King, Reginald D., Reynoldsville, Pa.; Philadelphia Dental College, 1896; died July 13; age 84.

Konantz, Christine M., Quincy, Ill.; Northwestern University Dental School, 1897; died May 3.

LaDuca, John J., Chicago; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1932; died August 12; age 56.

Landsman, Jerome J., Baxley, Ga.; Columbia University School of Dental and Oral Surgery, 1927; died June 16; age 55.

Lehrer, Henry, New York; New York College of Dentistry, 1912; died June 23; age 69.

Lohr, Vernon J., New Market, Va.; Georgetown University School of Dentistry, 1912; died July 7; age 70.

Luisi, Anthony, Philadelphia; University of Pennsylvania School of Dentistry, 1919; died August 4; age 59.

MacDonald Neil F., Yarmouth, Mass.; Harvard Dental School, 1918; died June 14; age 62.

Mahley, Don A., Peru, Ind.; Indiana Dental College, 1924; died July 5; age 63.

Matter, Louis H., Freeport, Ill.; Chicago College of Dental Surgery, 1897; died May 31; age 85.

Meroney, William F., Winston-Salem, N. C.; Meharry Medical College School of Dentistry, 1934; died June 14; age 55.

Morey, Frank H., Eugene, Ore.; New Orleans Dental College, 1906; died July 18; age 76.

Morrow, Burton A., Sioux City, Iowa; University of Iowa College of Dentistry, 1898; died January 1; age 87.

Mullen, Raymond J., Bessemer, Mich.; University of Michigan School of Dentistry, 1916; died July 11; age 64.

Mullin, William E., Wollaston, Mass.; Tufts College Dental School, 1922; died June 8; age 59.

Nicholson, Nathaniel G., Charleston, W. Va.; Detroit College of Medicine, Department of Dental Surgery, 1902; died July 20; age 84.

Nickell, James T., Stanton, Ky.; Ohio College of Dental Surgery, University of Cincinnati, 1910; died July 28; age 81.

Nief, Joseph S., Union City, N. J.; New York College of Dentistry, 1916; died August 11; age 68.

Nor, August C., Oakland, Calif.; University of California College of Dentistry, 1912; died August; age 71.

O'Connell, Harold V., Port Richmond, N. Y.; New York College of Dentistry, 1929; died July 17; age 53.

Oehmsen, Henry N., Harrison, N. Y.; University of Pennsylvania School of Dentistry, 1923; died August 18; age 58.

Okubo, Ituge, Los Angeles; College of Physicians and Surgeons, 1903; died July 1; age 85.

Olson, Caleb J., Hastings, Minn.; Northwestern University Dental School, 1914; died July 13; age 70.

O'Malley, Harold A., Rock Springs, Wyo.; University of Denver School of Dentistry, 1924; died July 6; age 59.

Palmer, Clifford J., Hutchinson, Kan.; Kansas City Dental College, 1913; died June 17; age 70.

Pardee, Edmund W., Newport, R. I.; Georgetown University School of Dentistry, 1906; died July 10; age 74.

Parkinson, Lawrence E., San Francisco; University of California College of Dentistry, 1923; died July 17; age 64.

Patrick, Clifford L., Mitchell, S. D.; Northwestern University Dental School, 1914; died July 31; age 69.

Patten, Warren, Livermore Falls, Maine; died June 12; age 62.

Patterson, James E., Mount Shasta, Calif.; Baltimore College of Dental Surgery, University of Maryland, 1901; died August 2; age 83.

Patton, Craig C., Kenton, Ohio; Starling-Ohio Medical College Department of Dentistry, 1907; died July 29; age 78.

Pelton, Lewie A., Bement, Ill.; Northwestern University Dental School, 1906; died June 10; age 77.

Pepper, Elisha D., Pickens, Miss.; Marion-Sims Dental College, 1902; died July 7; age 80.

Pereyra, Manuel, San Francisco; College of Physicians and Surgeons, 1919; died September 14; age 63.

Perkins, Charles E., Brockton, Mass.; Harvard Dental School, 1890; died Sept. 6; age 93.

Perry, Harold T., Bismarck, N. D.; Northwestern University Dental School, 1915; died July 4; age 68.

Plagman, Archibald A., Davenport, Iowa; University of Iowa College of Dentistry, 1923; died July 30; age 62.

Plasse, Oliver J., Woonsocket, R. I.; University of Maryland, Dental Department, 1919; died July 16; age 74.

Pollock, Robert B., Jr., Philadelphia; Philadelphia Dental College, 1898; died August 8; age 91.

Prettyman, Ralph W., Chicago; Northwestern University Dental School, 1913; died July 30; age 70.

Proctor, Charles M., Mount Dora, Fla.; Tufts College Dental School, 1901; died September 18; age 79.

Rainwater, William E., Detroit; Meharry Medical College School of Dentistry, 1905; died July 23; age 85.

Reeve, William D., Arcadia, Calif.; Northwestern University Dental School, 1914; died July 29; age 72.

Reilly, Thomas J., Altoona, Pa.; University of Pittsburgh School of Dentistry, 1926; died May 21; age 56.

Reisfeld, Abraham, New York; New York College of Dentistry, 1917; died August 21; age 63.

Renz, Samuel J., Seattle; Kansas City Dental College, 1892; died June 21; age 88.

Reynolds, Harry E., Pasadena, Calif.; University of Pennsylvania School of Dentistry, 1896; died August 25; age 87.

Rhoades, Rex H., Washington, D. C.; University of California College of Dentistry, 1902; died September 11; age 83.

Rice, Earle C., Sharon Hill, Pa.; Pennsylvania College of Dental Surgery, 1892; died August 7; age 86.

Rickel, Arthur J., Lansing, Mich.; University of Michigan School of Dentistry, 1903; died August 3; age 81.

Rivers, Ambrus B., Okmulgee, Okla.; University of Louisville School of Dentistry, 1908; died July 30; age 74.

Robinson, Thomas A., Birmingham, Ala.; Meharry Medical College School of Dentistry, 1913; died July 17; age 73.

Roland, Martin P., Los Angeles; Baltimore College of Dental Surgery, University of Maryland, 1921; died August 31; age 63.

Rothberg, Sidney H., Philadelphia; Temple University School of Dentistry, 1941; died August 7; age 41.

Rothermel, George S., Reading, Pa.; University of Pennsylvania School of Dentistry, 1901; died July 18.

Ruff, Augustine J., Hamburg, Pa.; Temple University School of Dentistry, 1911; died September 18; age 70.

Ruggles, Arthur M., Fergus Falls, Minn.; University of Minnesota School of Dentistry, 1909; died June 1; age 73.

Rulison, Frederick J., Reno, Nev.; University of California College of Dentistry, 1900; died May 25; age 82.

Ryman, Harry W., Summit, N. J.; University of Pennsylvania School of Dentistry, 1899; died July 24; age 84.

Sahlin, Sigfred S., Brooklyn; College of Dental and Oral Surgery, 1911; died August 1; age 73.

Savage Robert E., Webster City, Iowa; University of Iowa College of Dentistry, 1918; died July 13; age 66.

Scanlan, James B., Providence, R. I.; Tufts College Dental School, 1917; died May 20; age 77.

Schaffner, Guy D., Seattle; Chicago College of Dental Surgery, 1901; died July 1; age 80.

Schamu, Charles G., Syracuse, N. Y.; Northwestern University Dental School, 1899; died February 2; age 84.

Schluchter, Roy S., Wheaton, Ill.; Chicago College of Dental Surgery, 1914; died August 25; age 67.

Schneider, Edward F., Stockton, Calif.; College of Physicians and Surgeons, 1913; died August 4; age 69.

Schnell, Theodore W., Glendale, Calif.; University of Illinois College of Dentistry, 1909; died August 29; age 76.

Schulze, Robert L., Omaha; University of Iowa College of Dentistry, 1939; died August 8; age 42.

Schwartz Frank W., Cincinnati; Ohio College of Dental Surgery University of Cincinnati, 1901; died July 8; age 77.

Scott, Allen E., Woodside, Calif.; University of California College of Dentistry, 1916; died August 14; age 69.

Scott, James L., Missoula, Mont.; Chicago College of Dental Surgery, 1902; died July 19; age 83.

Scott, Lynn A., Milwaukee, Ore.; North Pacific College of Oregon School of Dentistry, 1919; died August 5; age 66.

Seidel, Frederick R., Hazelton, Pa.; University of Pittsburgh School of Dentistry, 1922; died May 20; age 64.

Selleck, Charles H., Chicago; Chicago College of Dental Surgery, 1906; died February 26; age 75.

Severance, Roy H., Palo Alto, Calif.; Northwestern University Dental School, 1905; died June 19; age 77.

Shannon, William H., Martin, S. D.; Chicago College of Dental Surgery, 1913; died May 21; age 67.

Shannon, Timothy M., Worcester, Mass.; Tufts College Dental School, 1923; died July 1; age 65.

Shapiro, Bernard A., Bergenfield, N. J.; New York College of Dentistry, 1915; died August 14; age 69.

Shapiro, S. George, Brooklyn; New York College of Dentistry, 1920; died February.

Sharp, Ralph D., Three Oaks, Mich.; University of Michigan School of Dentistry, 1956; died June 17; age 29.

Sheen, George B., Torrance, Calif.; Kansas City Dental College, 1907; died June 8; age 76.

Shellhorn, Arthur L., San Gabriel, Calif.; Washington University School of Dentistry, 1901; died July 30; age 83.

Shipman, William L., Paxton, Mass.; University of Maryland Dental Department, 1901; died June 24; age 80.

Shirley, Elwyn R., Buffalo; University of Buffalo, 1923; died June 16; age 62.

Shirley, Thomas C. F., Springfield, N. J.; University of Pennsylvania School of Dentistry, 1908; died September 20; age 75.

Shnayerson, Boris, Brooklyn; New York College of Dentistry, 1913; died May 29; age 81.

Shoop, Charles V., Denver; Kansas City Dental College, 1896; died June 22; age 86.

Shwalb, Harry, Brooklyn; New York College of Dentistry, 1917; died July 17; age 68.

Sickenga, Falkert N., Yakima, Wash.; North Pacific College of Oregon School of Dentistry, 1909; died July 11; age 79.

Sirlin, Anthony W., East Chicago, Ind.; Indiana Dental College, 1922; died June 8; age 60.

Sisson, James L., Fayetteville, Ark.; Kansas City Dental College, 1917; died May 24; age 71.

Slavin, Samuel, Wilkes-Barre, Pa.; Philadelphia Dental College, 1906; died June 27; age 79.

Smalbery, Fred W., Fennimore, Wis.; Marquette University Dental School, 1913; died January 10; age 69.

Smetana, Edward E., Minneapolis; University of Minnesota School of Dentistry, 1910; died July 17; age 77.

Smith, Charles F., Asheville, N. C.; Meharry Medical College School of Dentistry, 1927; died July 30; age 64.

Smith, Joseph L., Abington, Pa.; University of Pennsylvania School of Dentistry, 1906; died February 9; age 82.

Smith, Raymond J., Miami, Fla.; Northwestern University Dental School, 1941; died June 25; age 45.

Smith, Van A., Theinsville, Wis.; Marquette University Dental School, 1912; died June 18; age 70.

Spears, Andrew A., Brazil, Ind.; Indiana Dental College, 1903; died August 15; age 82.

Spotkin, Leon D., Philadelphia; Temple University School of Dentistry, 1916; died July 15; age 62.

Sprague, Harry A., Monroe, Mich.; Northwestern University Dental School, 1905; died August 11; age 75.

Squires, Sidney, Salt Lake City, Utah; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1927; died June 2; age 55.

Stamler, Isaac, Bronx, N. Y.; New York College of Dentistry, 1914; died July 29; age 74.

Stang, John T., Catonsville, Md.; Baltimore College of Dental Surgery, University of Maryland, 1929; died July 6; age 53.

Stanger, Henry, Jericho, N. Y.; Tufts College Dental School, 1932; died April 19; age 54.

Stanton, Edward C., Charleston, W. Va.; University of Michigan School of Dentistry, 1906; died July 24, age 79.

Steber, Oliver F., Clearwater Fla.; Washington University School of Dentistry, 1908; died July 26; age 71.

Stein, Irving W., New York; died June 19; age 70.

Stone, Alvin D., Cold Spring, Minn.; University of Minnesota School of Dentistry, 1921; died August 25; age 61.

Stuart, Howard C., St. Petersburg, Fla.; Detroit College of Medicine, Department of Dental Surgery, 1902; died April 1; age 80.

Sullivan, Michael C., Omaha, Neb.; Colorado College of Dentistry, 1922; died July 21; age 71.

Sussman, Rudolph, Elizabeth, N. J.; University of Pittsburgh School of Dentistry, 1928; died July 12; age 54.

Swenson, Arthur, Ridgefield, N. J.; Tufts College Dental School, 1932; died April 31.

Sweppenhiser, Claude E., Berwick, Pa.; Philadelphia Dental College, 1908; died September 18; age 75.

Swift, Charles F., Los Angeles; University of Buffalo School of Dentistry, 1954; died September 17; age 39.

Swisher, Fred J., Denver; Northwestern University Dental School, 1908; died May 31; age 75.

Swisher, Percy C., Cleveland; Baltimore College of Dental Surgery, University of Maryland, 1923; died May 23; age 59.

Taggett, William W., Mellen, Wis.; Chicago College of Dental Surgery, 1906; died May 22; age 76.

Talbot, Oliver S. L., Fort Leonard Wood, Mo.; Baylor University College of Dentistry, 1930; died July 24; age 56.

Taylor, Robert F., Clawson, Mich.; University of Michigan School of Dentistry, 1956; died April 12; age 30.

Taylor, William S., Jacksonville, Fla.; University of Louisville School of Dentistry, 1943; died August 5; age 40.

Tennant, Walter E., Fond du Lac, Wis.; Chicago College of Dental Surgery, 1901; died August 7; age 81.

Teter, Charles K., Twinsburg, Ohio; Ohio Medical University College of Dentistry, 1900; died May 29; age 83.

Thacker, Henry F., Evarts, Ky.; Louisville College of Dentistry, 1908; died May 5; age 72.

Thomas, Harold W., Park Rapids, Minn.; University of Minnesota School of Dentistry, 1925; died June 19; age 60.

Timborous, Joseph G., Akron, Ohio; Starling-Ohio Medical College Department of Dentistry, 1913; died May 17; age 70.

Tishler, Mark, Wellesley, Mass.; Tufts College Dental School, 1907; died July 31; age 79.

Tongue, Raymond K., Jr., Towson, Md.; Baltimore College of Dental Surgery, University of Maryland, 1943; died June 11; age 41.

Topel, Paul A., Oak Park, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1930; died September 16; age 52.

Trebbin, Frederick, Springfield, Mass.; died July 8; age 66.

Tremper, Richard H., Portsmouth, Ohio; University of Michigan School of Dentistry, 1917; died September 22.

Trenholm, Arthur T., Gresham, Ore.; North Pacific College of Oregon School of Dentistry, 1927; died July 19; age 67.

Tschummi, Claude B., Stafford Springs., Conn.; died August 22; age 76.

Tunney, Thomas, Groton, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1905; died May 30; age 87.

Turk, Bernard, New York; New York College of Dentistry, 1915; died August 30; age 72.

Tyler, Clyde L., Portland, Ore.; Chicago College of Dental Surgery, 1917; died June 22; age 63.

Uebelacker, William M., Ellensburg, Wash.; Creighton University College of Dentistry, 1918; died May 12; age 68.

Uhls, Alonzo D., Kansas City, Mo.; Kansas City Dental College, 1919; died August 5; age 61.

Upchurch, Calvin E., Union City, Tenn.; Vanderbilt University School of Dentistry, 1904; died May 18; age 81.

VanVoltinbergh, Robert L., Manchester, Iowa; University of Iowa College of Dentistry, 1916; died July 18; age 72.

Vehe, William D., Minneapolis; Chicago College of Dental Surgery, 1907; died June 14; age 76.

Victorson, S. Arthur, New York; College of Dental and Oral Surgery, 1921; died June 15; age 59.

Waalkes, Harry E., Chicago; Northwestern University Dental School, 1919; died August 5; age 72.

Wagner, George J., Sherman Oaks, Calif.; University of Nebraska College of Dentistry, 1929; died May 28; age 60.

Wagner, Laurence R., Washington, D. C.; George Washington University Dental Department, 1915; died June 28; age 69.

Wagner, William, Elmhurst, N. Y.; New York University College of Dentistry, 1919; died August 13; age 62.

Wagoner, William G., Bluefield, Va.; Medical College of Virginia School of Dentistry, 1914; died August 24; age 69.

Wark, Roy H., Barre, Vt.; Tufts College Dental School, 1919; died June 16; age 63.

Wallace, Irving E., Waterbury, Conn.; University of Pennsylvania School of Dentistry, 1937; died June 1; age 48.

Walters, Thomas J., Hattiesburg, Miss.; Tulane University School of Dentistry, 1910; died April 23; age 87.

Weber, Walter A., Norfolk, Neb.; University of Nebraska College of Dentistry, 1922; died June 12; age 61.

Weeks, Clarke B., Lakeland, Fla.; Atlanta Dental College, 1913; died May 12; age 71.

Weedin, James E., St. Joseph, Mo.; St. Louis University School of Dentistry, 1919; died August 17; age 60.

Weightman, Dean E., Mound City, Mo.; Kansas City-Western Dental College, 1928; died July 25; age 57.

Weinstein, Joseph A., Philadelphia; Temple University School of Dentistry, 1933; died June 6; age 49.

Weiss, Adolph, Brooklyn; Columbia University School of Dentistry and Oral Surgery, 1927; died May 31; age 57.

Welch, Cleve L., Rochester, N. Y.; Creighton University College of Dentistry, 1912; died May 19; age 72.

Weller, Karl F., Wilkinsburg, Pa.; University of Pittsburgh School of Dentistry, 1915; died March 26; age 68.

Welles, Paul G., Toledo, Ohio; Ohio State University College of Dentistry, 1923; died June 29; age 58.

Wells, William C., Medina, N. Y.; University of Pennsylvania School of Dentistry, 1895; died July 1; age 85.

Whelan, Joseph S., Concordia, Kan.; Chicago College of Dental Surgery, 1916; died July 10; age 72.

Whitlock, Maurice O., Inkster, Mich.; University of Detroit School of Dentistry, 1955; died August 8; age 37.

Wigdor, Harry, New York; New York College of Dentistry, 1917; died September 14; age 65.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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All expressions of opinion and statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association. Articles are accepted with the understanding that they have not been published previously and that they are submitted solely to The Journal. The Journal of the American Dental Association is indexed in the Index to Dental Literature, in the Current List of Medical Literature and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts and Chemical Abstracts.

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MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundred and First Annual Session	October 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 21-23	Birmingham	C. R. Crook, Professional Center, Montgomery
Alaska	July 5-7	Juneau	W. E. Alexander, 406 G St., Anchorage
Arizona	Apr. 13-15	Tucson	W. G. Burke, 15 E. Monroe St., Phoenix
Arkansas	Apr. 3-6	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 25-27	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 8
S. California	May 2-4	Los Angeles	J. H. Thomason, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 2-5	Colorado Springs	G. H. Siersma, 724 Republic Bldg., Denver 2
Connecticut	May 18, 19	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware			E. J. Truono, 1401 Gilpin Ave., Wilmington 6
Dist. of Columbia	Mar. 13-16	Washington	J. F. Keaveny, 1835 Eye St., N.W., Washington 6
Florida	May 15-18	Miami Beach	R. Chace, 518 Tampa St., Tampa
Georgia			F. M. Butler, Jr., 701 Southern United Bldg., Macon
Hawaii	Oct. 24-27	Honolulu	J. H. Dawe, Alexander Young Bldg., Honolulu 13
Idaho	Sept. 15-17	Sun Valley	H. E. Burgess, 151 Fourth Ave., N., Twin Falls
Illinois	May 11-13	Rockford	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 16-18	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 2-4	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines
Kansas	May 1-4	Wichita	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Mar. 31-Apr. 2	Lexington	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	Apr. 27-30	New Orleans	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine	June 16-18	Rockland	S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	June 8-12	Atlantic City	W. Schunick, 19 Medical Arts Bldg., Baltimore 1
Massachusetts	May 1-4	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	May 2-4	Detroit	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 25-27	St. Paul	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi	Apr. 24-27	Jackson	M. C. O'Keefe, Medical Arts Bldg., Jackson 2

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Missouri	May 22-25	St. Louis	E. D. Suggett, Merchants Bank Bldg., Jefferson City
Montana	May 5-7	Missoula	R. C. Ritter, 1236 N. 28th St., Billings
Nebraska	April 25-27	Omaha	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	June	Elko	O. M. Seifert, 755 Ryland Ave., Reno
New Hampshire	June 12-15	Whitefield	F. E. Williams, 814 Elm St., Manchester
New Jersey	Apr. 25-28	Atlantic City	J. G. Carr, 407 Cooper St., Camden
New Mexico	May 15-18	Albuquerque	W. A. Blueher, 2917 Santa Cruz, S. E., Albuquerque
New York	May 9-11	Buffalo	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 1-4	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota	Sept. 11-13	Williston	D. R. Perry, Box 866, Bismarck
Ohio	Nov. 13-16	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 24-27	Oklahoma City	L. D. Wright, 210 Plaza Court Bldg., Oklahoma City
Oregon	Mar. 7-9		T. D. Holder, Selling Bldg., Portland
Panama C. Z.	April	Ancon	G. E. Lilly, Box 29, Ft. Clayton
Pennsylvania	May 12-14	Harrisburg	I. Sissman, 217 State St., Harrisburg
Puerto Rico	Jan. 24-27	San Juan	R. Gonzalez R., Box 10452, Caparra Heights
Rhode Island	Jan. 19, 20	Providence	C. A. Spacagna, Union Trust Bldg., Providence
South Carolina	May 8-10	Greenville	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 15-17	Sioux Falls	R. E. Decker, Box 308, Parker
Tennessee	May 1-5	Memphis	K. P. Ezell, 119 Louise Ave., Nashville 5
Texas	Apr. 24-27	Fort Worth	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	Apr. 14-16	Ogden	R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont	June 24-26	Vergennes	E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 24-27	Richmond	M. E. Henderson, Shenandoah Bldg., Roanoke
Washington	Mar. 20-23	Seattle	G. D. Dore, Jr., 211 Medical Dental Bldg., Seattle 1
West Virginia	July 17-20	White Sulphur Springs	G. N. Casto, Jr., 710½ Lee St., Charleston
Wisconsin	May 9-11	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming	June	Jackson	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 19-25* June 20†	Birmingham	W. L. Smith, 524 Chestnut St., Gadsden
Alaska	July 5-8	Anchorage	E. I. Baggen, Box 1394, Fairbanks
Arizona	June 19-30	Florence	W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 20-25*†	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California			J. F. Steen, 507 Polk St., San Francisco
Colorado	June 19-25	Denver	B. DeRose, Republic Bldg., Denver 2
Connecticut			A. P. Delfini, 265 Church St., New Haven
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia			W. T. Birthright, 1835 Eye St., N.W., Washington
Florida	July 3-14* July 3, 4†	Jacksonville	R. P. Taylor, Jr., P.O. Box 2913, Jacksonville 3
Georgia	May 30-June 1*†	Atlanta	H. M. Robertson, 206 Donehoo St., Statesboro
Hawaii	Feb. 18-22‡		J. V. Ing, James Campbell Bldg., Honolulu

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Indiana	Dec. 7-10*†	Indianapolis	C. A. Frech, Gary National Bank Bldg., Gary
Iowa	June 6-10*†	Iowa City	P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas	Jan. 25*†‡		R. C. Windscheffel, Medical Arts Bldg., Smith Center
Kentucky	June 6-9*†	Louisville	J. J. Kelly, 102 W. Madison St., Franklin
Louisiana			A. R. deNux, Marksville
Maine			A. S. Appleby, Box 260, Skowhegan
Maryland			F. J. Bryce, 303 Granville Dr., Silver Spring
Massachusetts	Dec. 23, 24*†‡		C. R. Williams, 33 State House, Boston
Michigan	Jan. 24-30 June 5-11	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4W
Mississippi	Jan. 11-13*†	Jackson	A. H. Richter, Jr., Aven Bldg., Greenwood
Missouri			R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			R. O. Betzner, 303 Power Block, Helena
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada	Dec. 7	Las Vegas	R. Whitehead, Box 1547, Reno
New Hampshire	June 16, 17* June 16†	Boston	L. U. Bergeron, 211 High St., Somersworth
New Jersey			C. J. Schweikhardt, 150 E. State St., Trenton
New Mexico			G. D. Hastain, Box 1007, Clovis
New York	June 23, 24*	New York Buffalo	D. W. Beier, 23 S. Pearl St., Albany 7
	June 28-July 1*	New York Albany Syracuse Buffalo Rochester	
	Feb. 8†	New York Buffalo	
	Feb. 9, 10†	New York Albany Buffalo	
North Carolina			J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota	July 11-15	Fargo	F. A. Maides, First National Bank Bldg., Grand Forks
Ohio	June 6-11* June 11† June 13, 14*† June 16-18*	Columbus Columbus Columbus Cleveland	D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma	June 20-22* June 20, 22†	Oklahoma City	W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon	Dec. 7-9*†	Portland	F. L. Utter, Pioneer Trust Bldg., Salem
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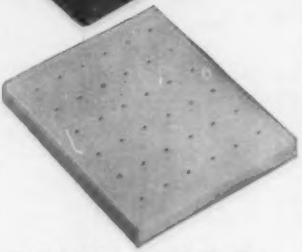

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Academy of Denture Prosthetics	June 19-24	San Juan, Puerto Rico	W. L. Warburton, Medical Arts Bldg., Salt Lake City 11
Academy of General Dentistry	Feb. 9	Chicago	A. L. Knab, 8500 S. Stony Island Ave., Chicago
American Academy of Crown and Bridge Prosthodontics	Feb. 6, 7	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Medicine	Dec. 6	New York	W. I. Levine, 809 Cathedral St., Baltimore
American Academy of Dental Practice Administration	Feb. 4-6	Chicago	R. H. Campbell, 18595 Grand River, Detroit 23
American Academy of Occlusodontia	Feb. 6	Chicago	J. Kaplan, 4802 N. Broadway, Chicago 40
American Academy of Oral Pathology	Apr. 27-29	Chicago	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis 14
American Academy of Restorative Dentistry	Feb. 6, 7	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association for Cleft Palate Rehabilitation	May 12-14	Denver	D. C. Spriestersbach, University Hospitals, Iowa City
American Association of Dental Schools	Mar. 20-23	Chicago	R. H. Sullens, 840 N. Lake Shore Dr., Chicago 11
American Association of Endodontists	Feb. 5-7	Chicago	V. B. Milas, 2559 W. 63rd St., Chicago 29
American Association of Industrial Dentists	Apr. 25-27	Rochester, N.Y.	E. R. Aston, Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg, Pa.
American Association of Orthodontists	Apr. 24-28	Washington, D.C.	E. E. Shepard, 8230 Forsyth Blvd., St. Louis 5
American Board of Dental Public Health	Oct. 13, 14	Los Angeles	D. J. Galagan, Divn. of Dental Public Health, PHS, Dept. of Health, Education and Welfare, Washington, D.C.
American Board of Oral Pathology	Dec. 5, 6		D. A. Kerr, University of Michigan, School of Dentistry, Ann Arbor, Mich.
American Board of Oral Surgery	Dec. 7 Apr. 1-4	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 18-23	Washington, D.C.	W. L. Wylie, University of California, School of Dentistry, Medical Center, San Francisco 22
American Board of Pedodontics	Dec. 14-17	Chicago	R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American College of Dentists, Illinois Section	Feb. 7	Chicago	V. B. Milas, 2559 W. 63rd St., Chicago 29
American Dental Assistants Certification Board	May 11-15 Oct. 12-16		D. Thacker, 1419 "S" St., S.E., Washington 20, D.C.
American Dental Society of Europe	July 5-8	Edinburgh, Scotland	J. P. Molony, 110 Harley St., London W.1, England
American Denture Society	Feb. 5, 6	Chicago	V. L. Steffel, College of Dentistry, Ohio State University, Columbus 10, Ohio
American Equilibration Society	Feb. 4	Chicago	R. C. Van Dam, 11431 S. Halsted St., Chicago 28
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 28	New York	M. H. Feldman, 730 Fifth Ave., New York
American Society of Geriatric Dentistry	Feb. 7	Chicago	P. G. Rubens, 55 E. Washington St., Chicago 2
American Society of Oral Surgeons (Forty-second)	Oct. 12-15	Phoenix, Ariz.	D. C. Trexler, 840 N. Lake Shore Dr., Chicago 11
British Dental Association	July	Edinburgh, Scotland	Secretary, British Dental Association, 13 Hill St., Berkeley Square, London W.1, England
Central Dental Association	Feb. 14-20	Aspen, Colo.	B. A. Gilbertson, Lowry Medical Arts Bldg., St. Paul
Chicago Dental Society	Feb. 7-10	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
Council on Dental Education, Dental Aptitude Tests	Jan. 8, 9 Apr. 22, 23		S. Peterson, 222 E. Superior St., Chicago 11
Dallas Mid-Winter Dental Clinic (Thirty-third)	Jan. 24-27	Dallas	B. Lawrence, 3200 Maple Ave., Dallas 4
Denver Dental Association	Jan. 10-13	Denver	T. O. Clark, 724 Republic Bldg., Denver 2
European Orthodontic Society (Thirty-Sixth Congress)	June 30-July 5	Belfast, Northern Ireland	H. T. A. McKeag, 35 Rugby Rd., Belfast, N.I.
Federation Dentaire Internationale, 48th Annual Meeting	June 20-25	Dublin, Ireland	G. H. Leatherman, 35 Devonshire Place, London W.1, England
Greater New York Dental Meeting (Thirty-fifth)	Dec. 7-11	New York	M. Purdy, Hotel Statler-Hilton, New York 1
Greater Philadelphia Annual Meeting	Mar. 8-11	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. and Pennsylvania Blvd., Philadelphia 3
International Association for Dental Research	Mar.	Chicago	D. Y. Burrill, Northwestern University Dental School, 311 East Chicago Ave., Chicago 11
Italian Dental and Maxillo-Facial Congress (Third)	May 19-22	Palermo, Sicily	E. Tempestini, Dental Clinic, University of Palermo, Palermo, Sicily
Midwest Society of Periodontology	Feb. 7	Chicago	G. Roth, 1108 E. 10th St., Kansas City 10, Mo.
Montana, Ninth District Dental Society	Jan. 21-23	Billings	C. H. Betzer, 1231 N. 29th St., Billings
National Board of Dental Examiners	Mar. 28, 29		G. J. Casey, 222 E. Superior St., Chicago 11
Ontario Dental Association	May 15-18	Toronto, Canada	Mrs. W. C. Durham, 230 St. George St., Toronto 5 Canada
Pan American Odontological Association (Twenty-third)	Dec. 9	New York	R. H. Brodsky, 14 E. 81st St., New York
Panamanian (Isthmus) Odontological Association, Third Dental Congress	Jan.		A. H. Berguida G., P.O. Box 4115, Panama, Republic of Panama
Philippine Dental Association	May 11		D. G. Santos, P.O. Box 1142, Manila, Philippines
Southeastern Society of Oral Surgeons	May 12-14	Biloxi, Miss	P. B. Whittington, Jr., Medical Arts Bldg., Greensboro, N.C.
Thomas P. Hinman Dental Meeting	Mar. 27-30	Atlanta, Ga.	T. J. Hicks, Jr., Doctors Bldg., Atlanta 8, Ga.
U.S.C. Dental Study Group of Mexico Thirteenth Annual Seminar	May 15-19	Acapulco, Mex.	G. Riquelme C., Paseo de la Reforma 95-803, Mexico 4, D.F.
Western Society of Periodontology	Mar. 27-29	Las Vegas, Nev.	H. A. Tyrrell, 1508 N. Sycamore St., Santa Ana, Calif.

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San Francisco 3, California

School of Dentistry
University of California
University Medical Center
San Francisco 22, California

School of Dentistry
University of Southern California
925 West Thirty-fourth Street
Los Angeles 7, California

School of Dentistry
College of Medical Evangelists
Loma Linda, California

DIST. OF COLUMBIA
School of Dentistry
Georgetown University
3900 Reservoir Road, N.W.
Washington 7, D. C.

College of Dentistry
Howard University
600 W. Street, N.W.
Washington 1, D. C.

GEORGIA
School of Dentistry
Atlanta-Southern Dental College
Emory University
106 Forrest Avenue, N.E.
Atlanta 3, Georgia

ILLINOIS
Chicago College of Dental Surgery
Loyola University
1757 West Harrison Street
Chicago 12, Illinois

The Dental School
Northwestern University
311 East Chicago Avenue
Chicago 11, Illinois

College of Dentistry
University of Illinois
808 South Wood Street
Chicago 12, Illinois

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Indiana University
1121 West Michigan Street
Indianapolis 2, Indiana

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College of Dentistry
State University of Iowa
Dental Building
Iowa City, Iowa

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School of Dentistry
University of Louisville
129 East Broadway
Louisville 2, Kentucky

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School of Dentistry
Loyola University
6363 St. Charles Avenue
New Orleans 18, Louisiana

MARYLAND
Baltimore College of Dental Surgery
The Dental School
University of Maryland
618 West Lombard Street
Baltimore 1, Maryland

MASSACHUSETTS
Harvard School of Dental Medicine
188 Longwood Ave.
Boston, Massachusetts

School of Dental Medicine
Tufts University
136 Harrison Avenue
Boston 11, Massachusetts

MICHIGAN
School of Dentistry
University of Detroit
630 East Jefferson Avenue
Detroit 26, Michigan

School of Dentistry
University of Michigan
Ann Arbor, Michigan

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School of Dentistry
University of Minnesota
Washington Ave. and Union St., S.E.
Minneapolis 14, Minnesota

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School of Dentistry
The University of Kansas City
1108 East Tenth Street
Kansas City 6, Missouri

School of Dentistry
St. Louis University
3556 Caroline Street
St. Louis 4, Missouri

School of Dentistry
Washington University
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College of Dentistry
University of Nebraska
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School of Dentistry
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Teaneck, New Jersey

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Seton Hall University
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New York University
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University of Buffalo
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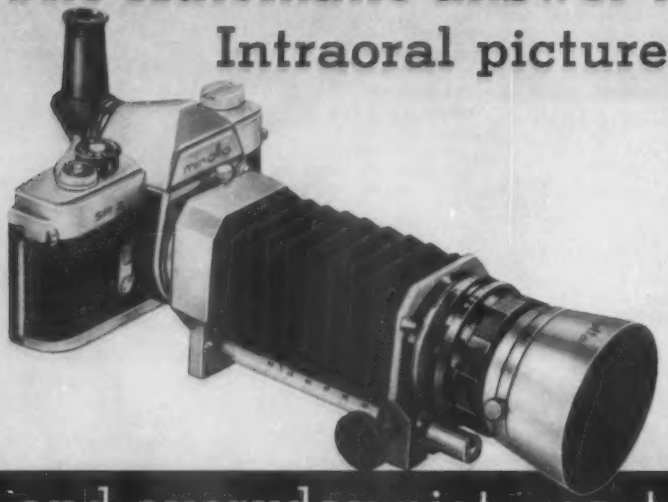

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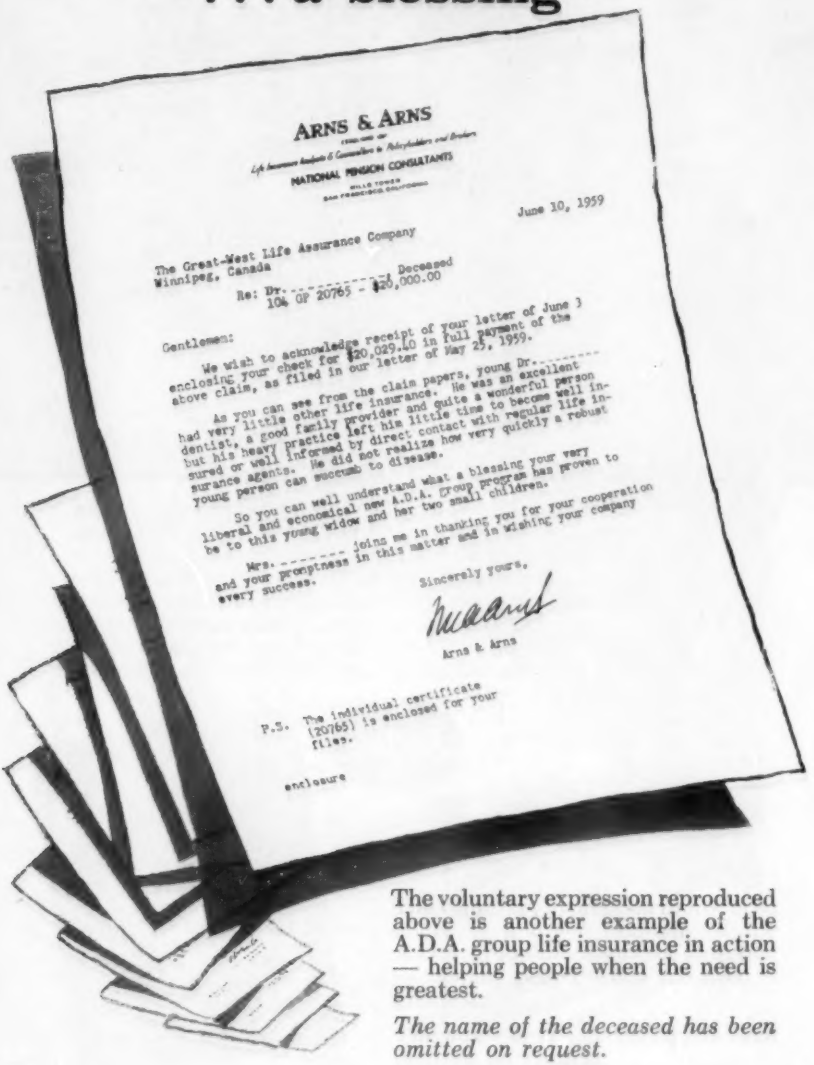

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June 10, 1959

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Winnipeg, Canada

Re: Dr. _____ Deceased
104 GP 20765 - $20,000.00

Gentlemen:

We wish to acknowledge receipt of your letter of June 3 enclosing your check for $20,029.40 in full payment of the above claim, as filed in our letter of May 25, 1959.

As you can see from the claim papers, young Dr. _____ had very little other life insurance. He was an excellent dentist, a good family provider and quite a wonderful person but his heavy practice left him little time to become well informed by direct contact with regular life insurance agents. He did not realize how very quickly a robust young person can succumb to disease.

So you can well understand what a blessing your very liberal and economical new A.D.A. group program has proven to be to this young widow and her two small children.

Mrs. _____ joins me in thanking you for your cooperation and your promptness in this matter and in wishing your company every success.

Sincerely yours,

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P.S. The individual certificate (20765) is enclosed for your files.

enclosure

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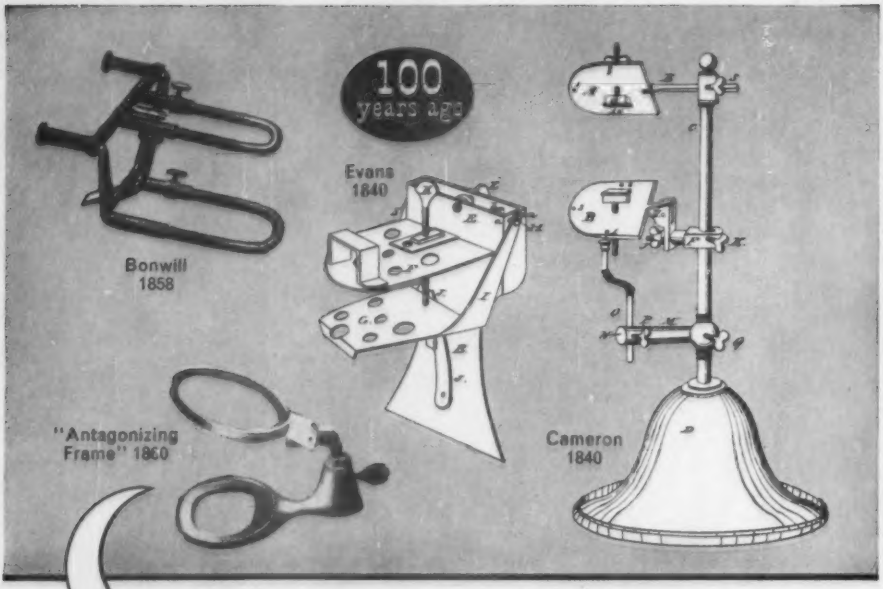
The name of the deceased has been omitted on request.

UNDERWRITERS OF THE A.D.A.
GROUP LIFE PROGRAM

THE GREAT-WEST LIFE ASSURANCE COMPANY
HEAD OFFICE - WINNIPEG, CANADA



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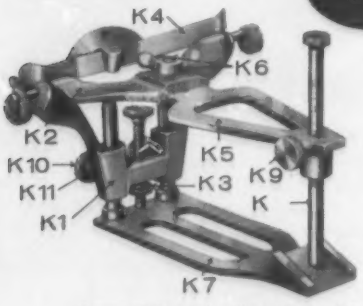

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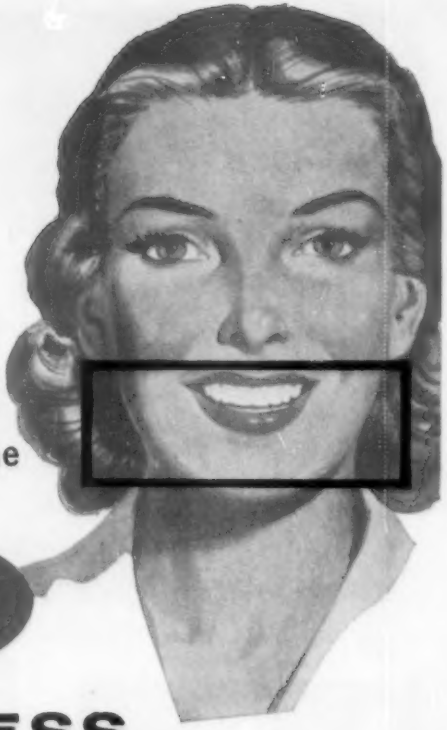

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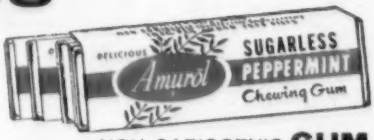

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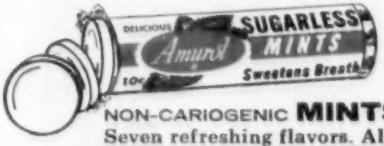

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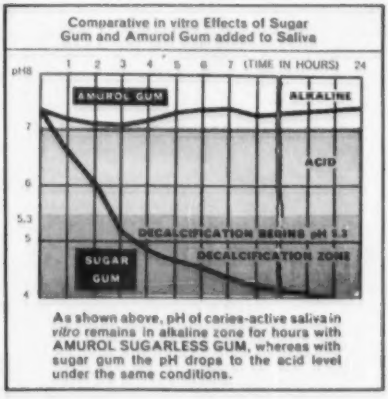

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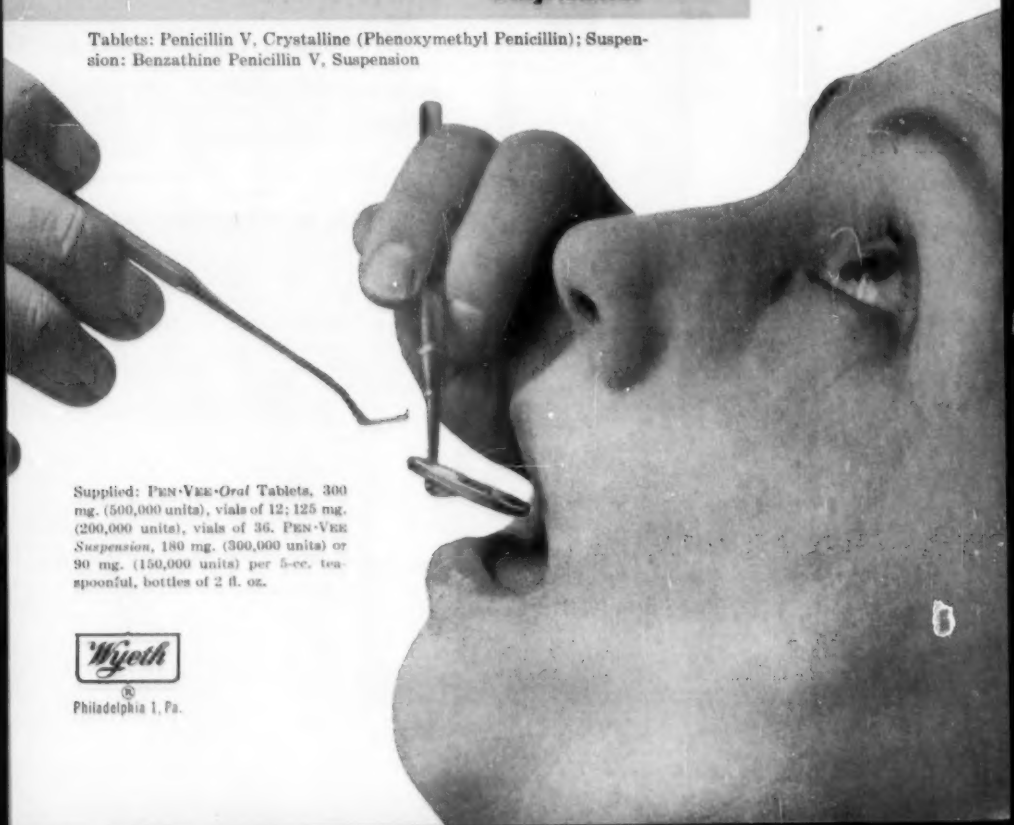

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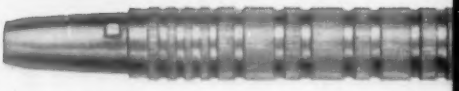

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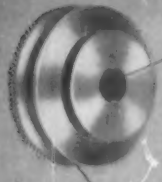

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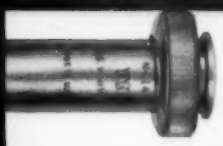

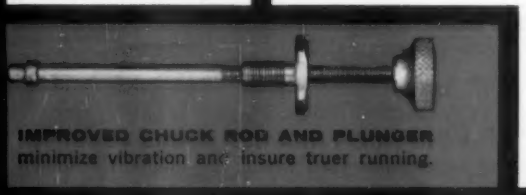

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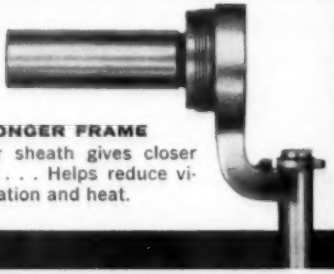

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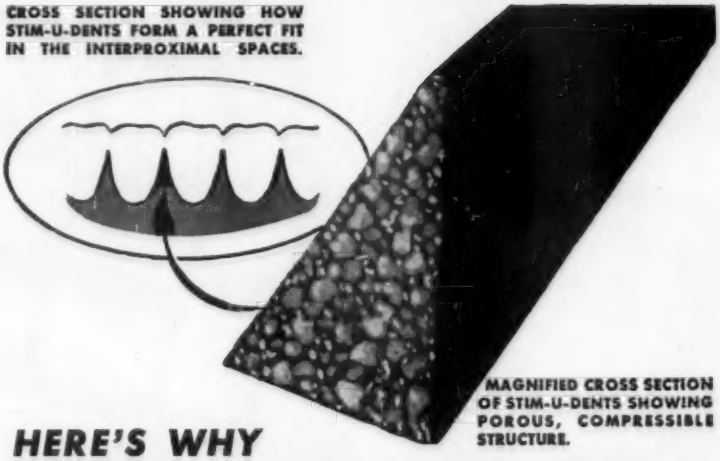

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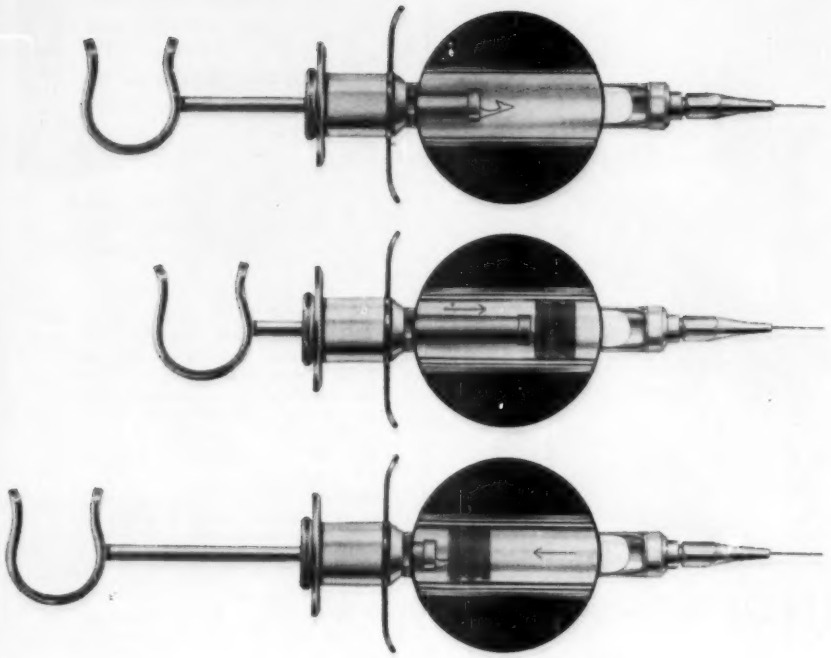

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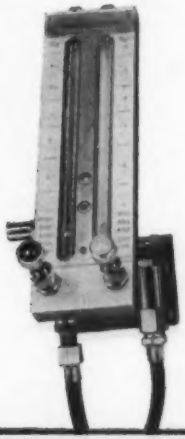

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CALIFORNIA—For lease. Air conditioned brick medical building with ample parking. Carpeted waiting room. F.M. music; two operatories, x-ray laboratory, recovery room and business office. Population 50,000. Write Dr. Ted W. Pilger, 14540 Hamlin St., Van Nuys, Calif.

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CALIFORNIA—Now leasing. One story, modern, air conditioned dental suites in expanding southern California community. Four medical suites in building besides dental offices. Write Dr. S. J. Oftedal, 823 N. Park Ave., Pomona, Calif.

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MINNESOTA — Midway Center, St. Paul. Space available for orthodontist or exodontist. Located in heart of Midway district of St. Paul. For information write Fred Wolff, 303 Pioneer Bldg., St. Paul, Minn.

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OHIO—Will lease or take associate into busy practice. Northern Ohio city of 380,000. Available December 1. Associate will work alone through March 15, share office after that with purchase or partner option. Address A.D.A. Box No. 625.

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CALIFORNIA—Associate wanted. Full time. Please send full particulars in first letter. Dr. L. F. Parker, 6919 Magnolia Ave., Riverside, Calif.

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MINNESOTA—Wanted. Oral surgeon, adequate anesthesia training essential. State all particulars, marital and military status, etc. Potential partnership in three to five years. Confidential. Address A.D.A. Box No. 655.

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NEW YORK-Brooklyn—Wanted. Associate. Full or part time in well established oral surgery practice. Boards qualified man preferable. Give details of education, training and experience in oral surgery and anesthesiology. Address A.D.A. Box No. 656.

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NEW YORK—Wanted. Dentist for medical group in upstate New York. General dentistry. Excellent opportunity for young dentist interested in conscientious dental care as part of comprehensive medical program. Include information regarding age, marital status, schools attended, military status and special dental training or experience in reply. Address A.D.A. Box No. 387.

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SOUTH DAKOTA—We will make an attractive proposition to a dentist who would locate in our town. Excellent potential. If interested write to Secretary, Commercial Club, White River, S. D.

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TEXAS—Approved oral surgery residencies, prosthetic residencies and dental internships available July 1, 1960, in 1,300 bed V.A. Hospital affiliated with University of Texas Dental College, Texas Medical Center. U. S. citizenship required. Chief, Dental Service, V.A. Hospital, Houston 31, Texas.

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California dentist, semi-retired, would like to associate in a practice either by purchase or salary. Reason—would like to work out some plan whereby both dentists would work only three days a week. Address A.D.A. Box No. 658.

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FLORIDA—Want position part time or association in area between Hope Sound and Fort Lauderdale. Six years general private practice. Good with children, 32 years old, married, military service completed. Address Karl W. Krauss, 163 Seminole Ave., Palm Beach, Fla., or call Temple 3-2952. Available for interviews Dec. 18 to Jan. 3.

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Oral surgeon, age 30, New York and New Jersey licensed, National Boards, desires association with established oral surgeon or group practice. Will take necessary Boards. Address A.D.A. Box No. 666.

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Oral surgeon desires association or teaching position. Age 29. Excellent background and recommendations. Three years Board approved training (M.S. oral surgery). Two years military service as oral surgeon. Will take Boards. Available June. Address A.D.A. Box No. 667.

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VIRGINIA—Well qualified and experienced dentist desires association in busy general practice with or without option to buy or partnership. Address A.D.A. Box No. 668.

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Anesthesiologist, M.D., available for dental anesthesia. Appointment basis. Massachusetts and Rhode Island. Indicate needs. Address A.D.A. Box No. 669.

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Physician-dental anesthetist. Experience includes three years' anesthetist in 40 bed hospital; one year association dental anesthetist to dentist for ambulatory full mouth rehabilitation patients under balanced anesthesia. Desire full or part time opportunity within approximately 50 mile radius Manchester, N. H. Can invest in new venture. Address A.D.A. Box No. 670.

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Wanted. Used Scott milling machine. Address A.D.A. Box No. 671.

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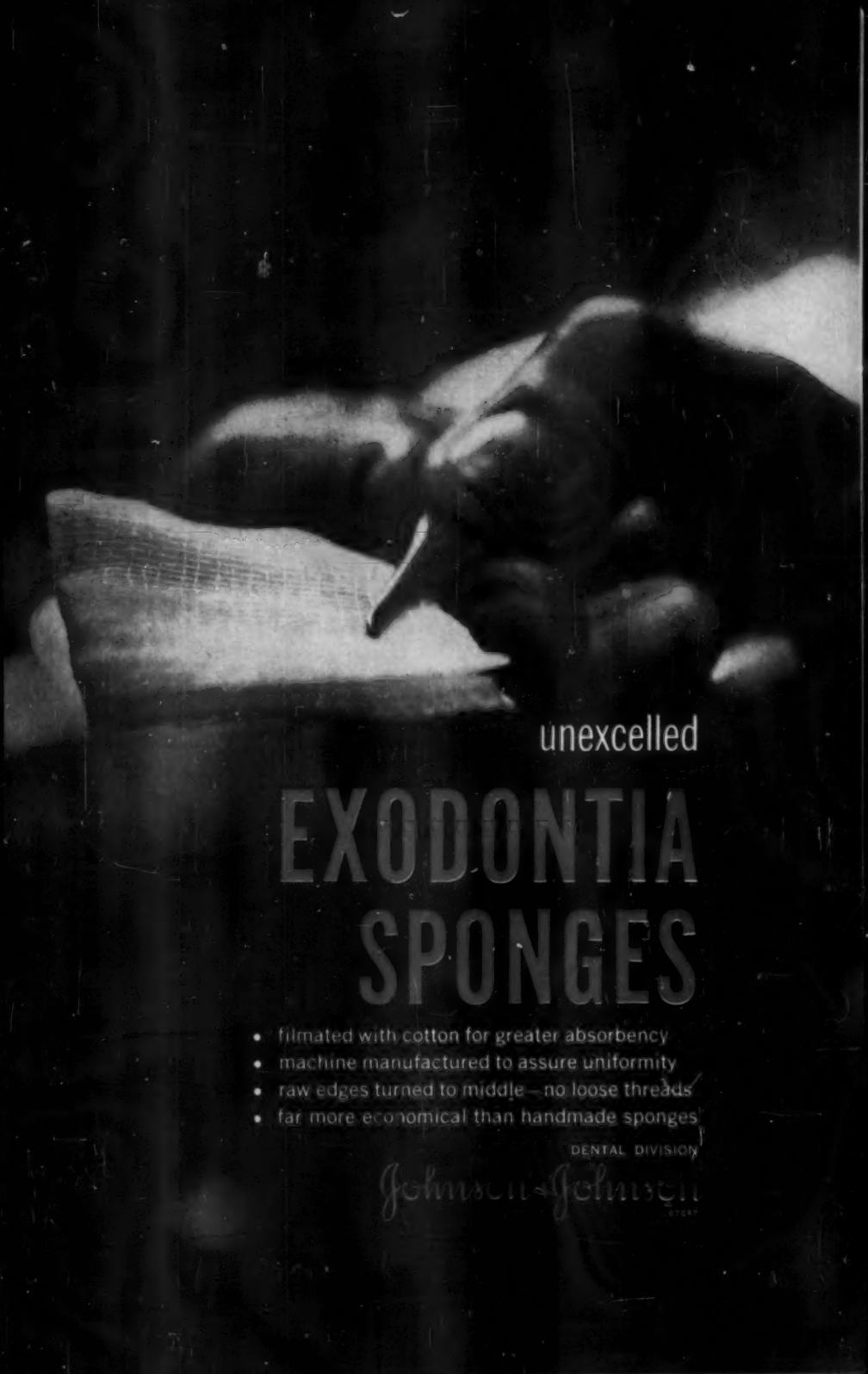
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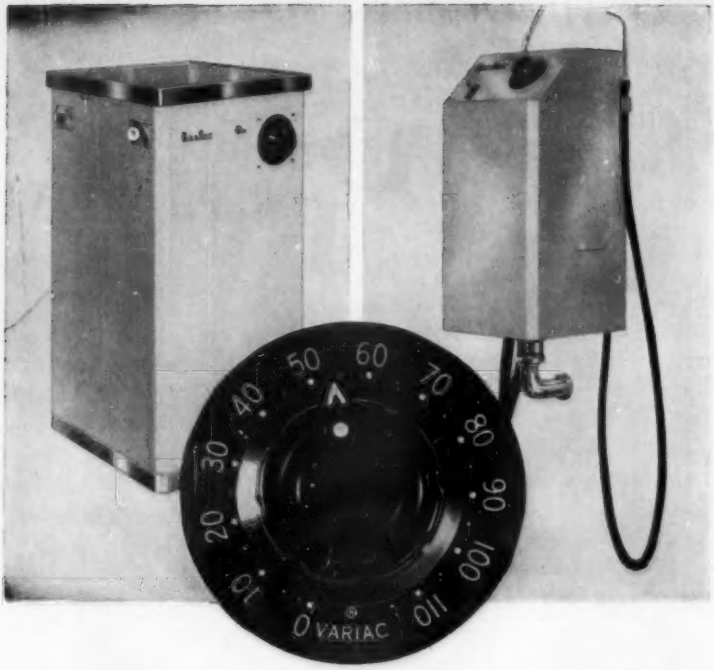

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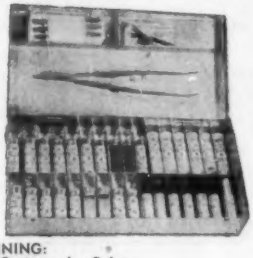

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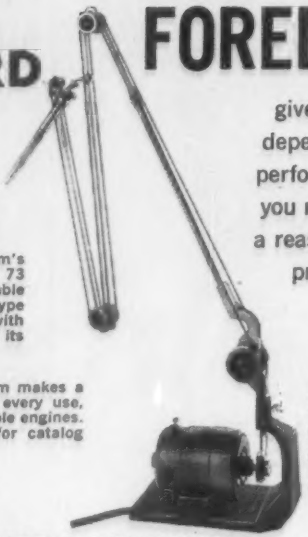

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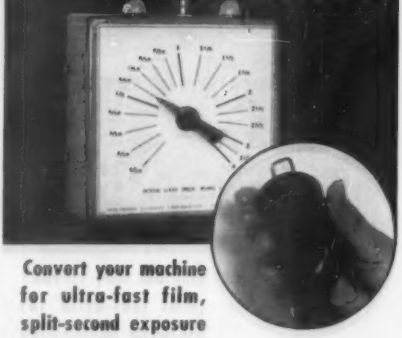

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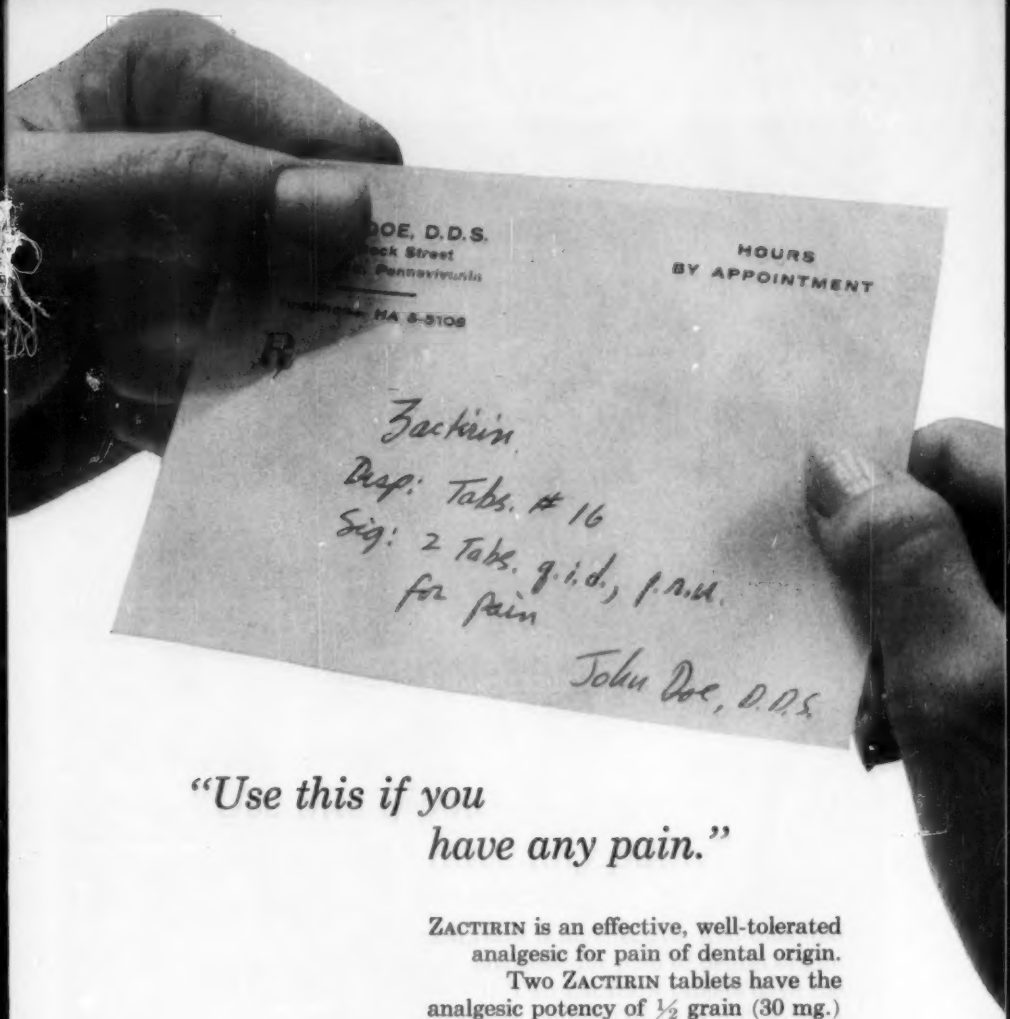

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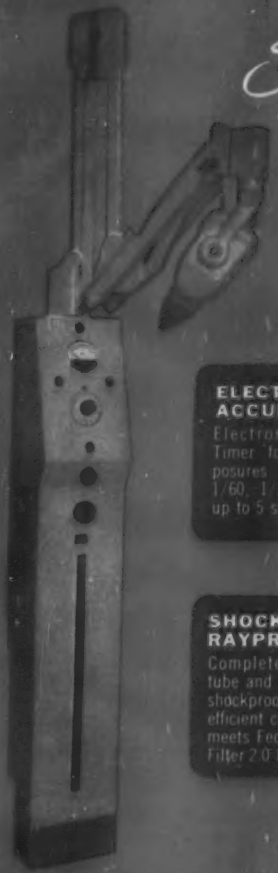

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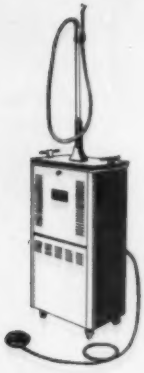

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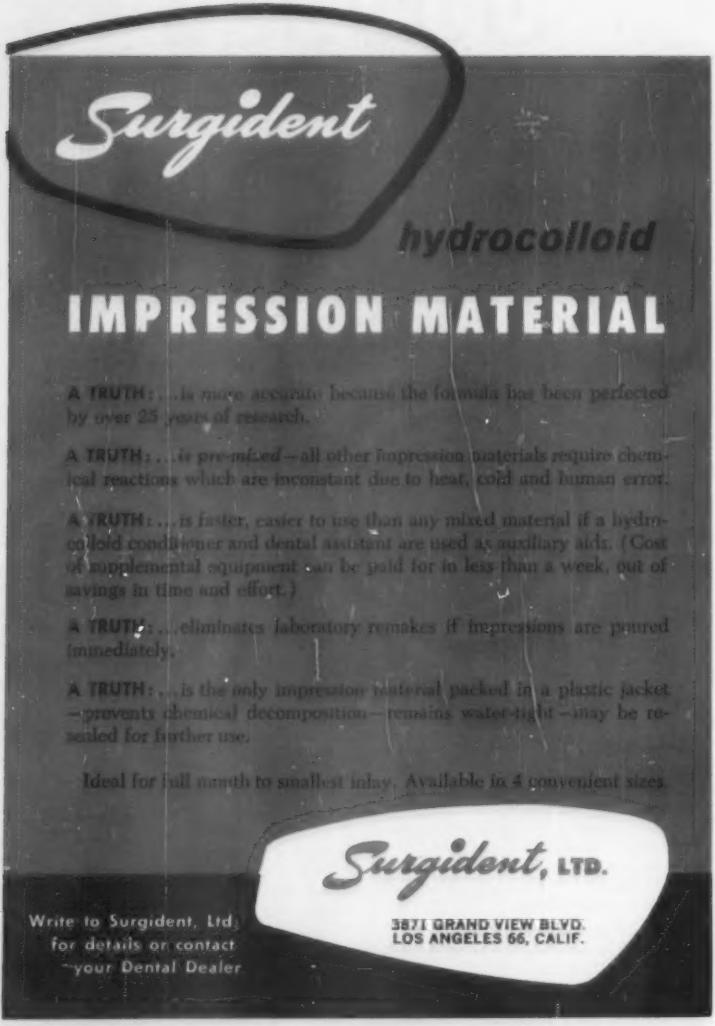
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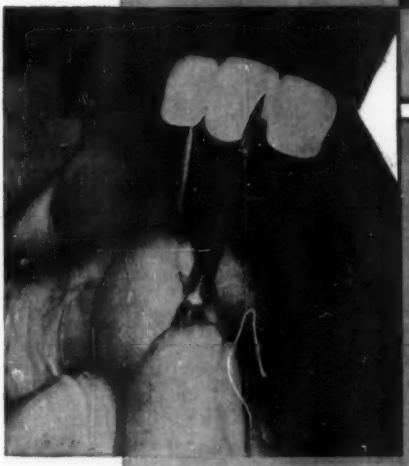

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